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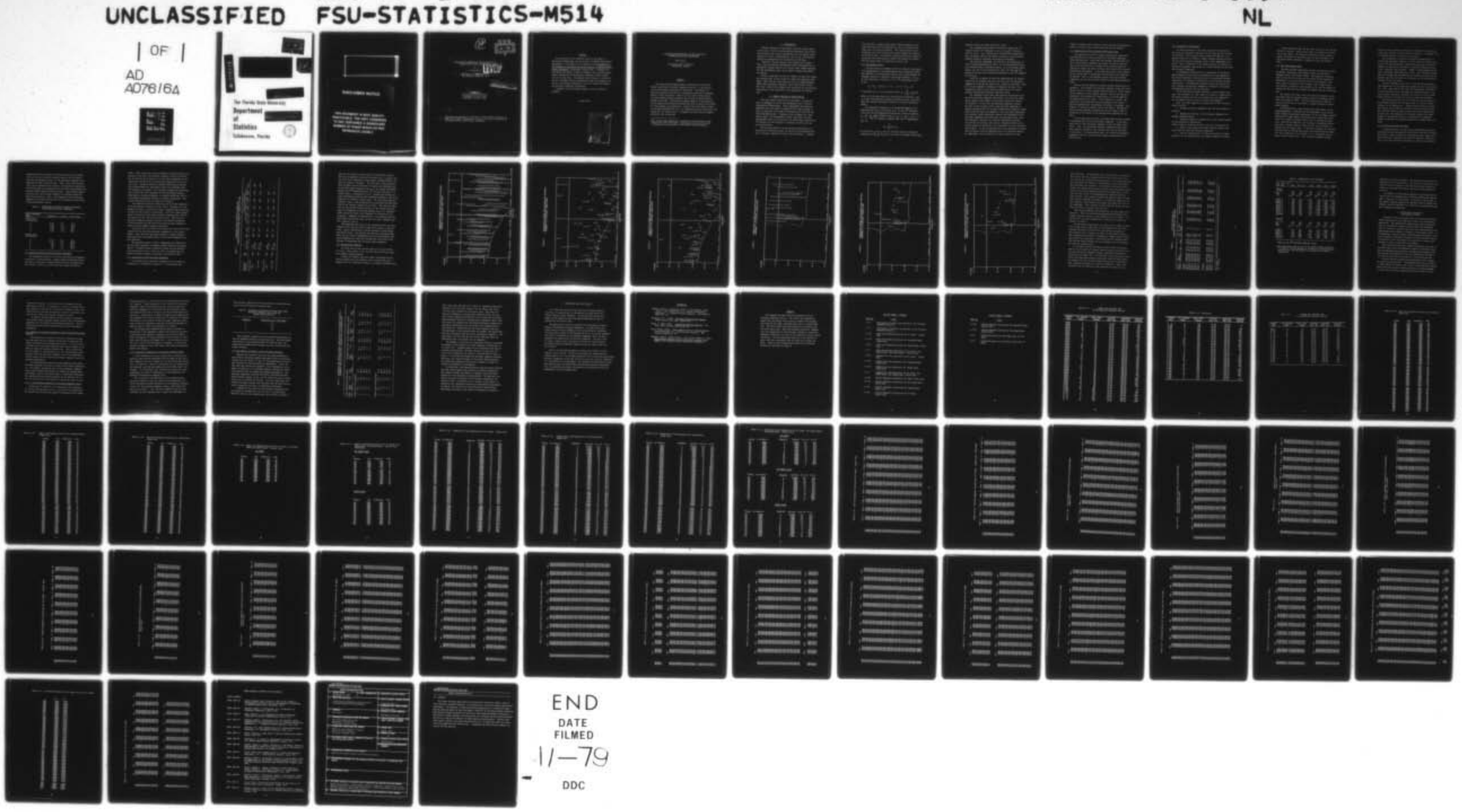

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A MULTIVARIATE METHODOLOGY FOR THE ANALYSIS OF WEATHER MODIFICATION EXPERIMENTS

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PREFACE

The main body of this technical report is the paper "A Multivariate Methodology for the Analysis of Weather Modification Experiments". This paper will be printed in the Proceedings of the Workshop on Statistical Design and Analysis of Weather Modification Experiments, Tallahassee, October 1978. In addition to that paper this report includes an Appendix that provides supplemental information on the principal components results summarized in the main body. The Appendix gives details on station locations, estimated station precipitation means and standard deviations, eigenstructure estimates, as well as station-to-station and station-to-component correlations.

A complete list of technical reports on this contract is appended.

Elton Scott

A MULTIVARIATE METHODOLOGY FOR THE ANALYSIS OF WEATHER MODIFICATION EXPERIMENTS*

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ABSTRACT

This paper develops applications of multivariate statistical models, particularly principal component analysis, to the analysis of data from weather modification experiments. The efficacy of these multivariate applications is examined by applying the proposed models to data from Phase I (1967-71) of the Santa Barbara Convective Band Seeding Program conducted for the Navy by North American Weather Consultants. Multivariate summary measures of precipitation are developed and multivariate methods are given to analyze the effects of cloud-seeding on precipitation. Results from these models, based on the above-mentioned data set, are reported along with conclusions and suggestions for further work. An Appendix provides detailed summary statistics for the analyses.

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1. INTRODUCTION

Weather modification experiments generally produce multivariate data. Both the precipitation measurements and concomitant variables for a given experimental unit are usually represented as a vector of measurements, and as such, multivariate methods are appropriate for the analysis of the data.

Logically, the data analysis can proceed in two steps. First, the precipitation measurements must be represented by an appropriate summary measure and, second, these summary measures for the experimental units can be used to examine the effects of seeding.

Below, in Sections (2) and (3), models for these two stages are reviewed and, at each stage, the models are applied to the Phase I data from the Santa Barbara Convective Seeding Program (SBA-I data hereafter) (Thompson, Brown, and Elliott, 1975). The final section of the paper gives conclusions on the analyses, limitations of this application, and suggestions for further work.

2. SUMMARY MEASURES OF PRECIPITATION

With most weather modification experiments, a large network of raingages is set up over designated areas to collect precipitation measurements. Often measurements from each experimental unit are simply averaged and the simple average is taken to represent the volume of precipitation on the area for that experimental unit. Inasmuch as the raingages are irregularly spaced, the measurements include some noise, and the measurements tend to be positively (but imperfectly) correlated, the adequacy of such averages to represent the full data set can be questioned.

This section provides a brief intuitive description of a multivariate statistical model for dealing with correlated data sets, Principal Components Analysis (PCA hereafter). A method

that uses PCA to produce multivariate summary measures of precipitation data from the experimental units is presented and other uses of PCA are considered. This section close with an evaluation of results obtained when these methods were applied to the SBA-I data. The measures produced at the first stage can be used in the second stage to examine the effects of seeding and the second stage is considered in Section (3).

2.1 The Concept of PCA

The data array is arranged so that the vectors of precipitation measurements for the experimental units (convective bands) are regarded as the observation vectors and the measurements at raingage stations as (possibly) correlated variables. Let $y_{i\alpha}$ be the measurement at Station i in the α^{th} experimental unit. We use

$$z_{i\alpha} = (y_{i\alpha} - \bar{y}_i)/s_i \quad i = 1,2,\ldots, p; \; a = 1,2,\ldots,N,$$

to calculate the p × p correlation matrix, $\underset{\sim}{R} = [\sum_{\alpha=1}^{N} z_{i\alpha} z_{j\alpha}/N]$, where $\bar{y}_i$ is the mean over the N observations at Station i, and s_i is the corresponding estimated standard deviation calculated from the N values (observed at Station i for the N convective bands).

The principal components to be determined depend on the characteristic roots and vectors of $\underset{\sim}{R}$. Let the k^{th} characteristic root and corresponding characteristic vector be given by λ_k and $\underset{\sim}{a}_k$, where elements of $\underset{\sim}{a}_k$ are a_{ki}, i = 1,2,...,p, k = 1, 2,...,p. The k^{th} principal component for the α^{th} experimental unit is:

$$c_{k\alpha} = \sum_{i=1}^{p} a_{ki} \, z_{i\alpha}.$$

Of course the $\underset{\sim}{a}_k$ and λ_k must be estimated and these estimates (designated as $\hat{\underset{\sim}{a}}_k$ and $\hat{\lambda}_k$ below) are used to estimate the principal

component values for each observation vector.

The estimated product-moment correlation between the i^{th} variable and the k^{th} component is given by $\hat{a}_{ki}\sqrt{\hat{\lambda}_k}$ (Morrison, 1976 (p. 271)). Thus, coefficients estimated from standardized data (as above) indicate the extent and sign of the association between variables (stations) and principal components.

The principal components are ordered by the proportions of total variance represented by them. If the characteristic roots are extracted from a correlation matrix, as in the present application, the sum of the characteristic roots will be p and the proportion of the total variance attributable to the k^{th} component will be λ_k/p.

Since PCA is applied so that the dimensionality of response vectors can be reduced, one would like the first few principal components to account for most of the variance of the data. Thus, if J of the components "adequately" represent the data, the p-dimensional variate vector could be summarized by the corresponding J-dimensional principal component vector.

All variables usually have high pairwise correlations with the first principal component and further, the second and subsequent components may exhibit strong associations with subsets of variables. If the first few principal components account for most of the variance, and if each principal component is highly correlated with one or more representative stations, future data collection might be simplified. Data from these representative stations should essentially contain the information of the principal components with which they are associated, and, since the components represent the essential information from the full network of stations, most of the information from the full network should be reflected in the information from the representative subset. If these assumptions hold, the efficiency of future data collection could be improved since costs should be reduced by improvement in the reliability of data collection at the

subset of stations and collection of data from the representative subset of stations only, rather than from the full network.

2.2 Application of PCA to Weather Modification Data

The application of PCA to weather modification experiments would proceed with initial estimation of principal components from available data. Given that the estimates indicate that the first few principal components do account for most of the variance in the full data set, a subset of key stations could be selected to reduce the costs of future data collection in weather modification experiments. If the data are pooled in this manner, we must assume that the principal axes of data are not affected by seeding. That is, the approach assumes that the principal components are the same for both seeded and unseeded experimental units.

PCA can also be applied to evaluate weather modification experiments. The estimates of principal component values for experimental units are vector summary response measures. These vectors can be compared to other summary measures, such as the mean precipitation, to determine the effectiveness of the PCA approach to summarization of the data. If this approach is useful, the vectors for the seeded data could be compared to the vectors from the unseeded data to determine the effects of seeding. This analysis is pursued in Section (3) of this paper. The patterns of the station-component correlations may also prove useful in evaluation of the nature of the precipitation response over an area.

In most applications of PCA, the simple mean of the variables is associated with the first principal component. If the band means and the first principal component scores are highly correlated, then the second and subsequent components must represent essential features of the variates that are not reflected in their mean. For precipitation data, the second and subsequent components could be associated with subarea concentrations of precipitation.

2.3 Evaluation of PCA Results

An obvious question on the above procedure is "How well do the first few components represent the data from the full network of stations?" This question can be answered through use of regression analysis to "predict" summary response measures of interest with the principal component values as the independent variables. Thus, if the mean is the summary measure of interest, it should be reasonably represented as a linear function of the first few principal components.

An alternative evaluation of the usefulness of the PCA approach depends on the ease of interpretation of the components. The station-component correlations may be interpretable through examination of a graphical presentation of the station-component correlations. Interpretation procedures often are tenuous however, because the principal components sometimes do not present interpretable patterns for the variables.

If the PCA results compare favorably to other summary measures, the usefulness of a key subset of stations in representing the summary measure can also be evaluated from the regression of the summary measure on the key station measurements.

Thus, the steps suggested in application of PCA to precipitation data are:

1. Estimate principal components over the full network of stations.

2. Examine the efficacy of the principal components as a summary response measure.

3. Interpret graphical presentations of the station-component correlations as appropriate.

Further steps to reduce future data collection costs would be:

4. Select a key subset of stations that are highly correlated with the first few principal components.

5. Test the effectiveness of these key stations in representation of the information in the summary measure of interest.

Final steps would then use the above results to test for the effects of seeding. These testing steps are detailed in Section (3) of this paper. The remaining subsections of this section report the results of the above steps for data from Phase I of the Santa Barbara experiments (Thompson, Brown, and Elliott; 1975).

2.4 The Santa Barbara Data

The Santa Barbara experiments and data are briefly reviewed by Bradley, Srivastava, and Lanzdorf (1977) and detailed in Thompson, Brown, and Elliott (1975). The frequency of missing data at many of the stations and the nature of PCA required an adjustment in the set of stations used in this analysis. The basic areas of interest are the "Control" and "Target" areas (see Bradley, Srivastava, and Lanzdorf, 1977), but the number of stations in each area was reduced considerably because of missing data.

The control and target areas were analyzed separately to be consistent with the response surface approach of Bradley, Srivastava, and Lanzdorf (1977). The resulting principal component values could be used as covariates or summary measures in subsequent analyses.

As mentioned above, many stations had large numbers of missing measurements (a complete set of measurements for a station would include precipitation measurements for all 107 Phase I bands). Stations with large numbers of missing values present the possibility of a sample covariance matrix that is not positive definite. When PCA was applied to all stations, irrespective of missing data, sizeable negative characteristic roots occurred, especially for the target area. To avoid this problem, all stations with more than 22 missing band values were exluded from the analysis (this cutoff point is arbitrary, but it did improve the behavior of the latent roots). This deletion procedure yielded

nineteen control stations (fifteen were deleted) and seventy-two target area stations (thirty-eight were deleted). A complete list of included stations is given in the Appendix.

The elimination of stations could have systematically excluded some geographic subareas in either Target or Control Areas. To test for this possibility, multivariate analysis of variance (MANOVA) was applied to the vector of location coordinates (latitude, longitude, and altitude). MANOVA is the multivariate analog of univariate ANOVA (Morrison, 1976). The "treatment" groups were the included and excluded sets of stations, and the null hypothesis was that there were no differences in the mean location vectors for the two groups.

The null hypothesis could not be rejected for the Control-Area groups but for the Target-Area groups, the null was rejected ($\alpha = .05$). This implies that there are significant differences in the coordinates of the excluded and included stations. This could produce systematic variations for results on the included subset relative to results for the full network of stations.

The excluded stations for the Target Area were primarily in the northeast quadrant of the Target Area, so they are remote relative to the seeding site. Because these stations are generally remote, the systematic exclusion of these stations should not limit the extent to which results below can be generalized. In any event, the advantages of including stations with large amounts of missing data were not considered to be important enough to overcome the problems produced by including these stations.

2.5 Principal Component Estimates

As specified above, the data were standardized and correlation matrices were estimated for the stations over the 107 bands. The pairwise simple correlations estimates on $\underset{\sim}{R}$ were based on all data available in common for each pair of stations. Characteristic roots and associated characteristic vectors were obtained

separately for the 72-square correlation matrix for the Target Area and for the 19-square correlation matrix for the Control Area and corresponding values for the principal components were obtained for each convective band. Table 1 gives the characteristic roots, proportions of variance, and cumulative proportions of variance that are accounted for by the first few principal components of both Target and Control Areas. These results suggest that the first few principal components do indeed account for much of the variance. Thus, a few dimensions of the principal component vector accounts for most of the variance in the precipitation measurement vectors.

TABLE 1: EIGENVALUES AND PERCENT VARIANCE ASSOCIATED WITH PRIMARY PRINCIPAL COMPONENTS

Princ. Component Number	Eigenvalue	% of Var.	Cum. % Var.
Target Area (72 Stations):			
1	51.33	71.3	71.3
2	4.80	6.7	78.0
3	4.23	5.9	83.8
4	2.07	2.9	86.7
5	1.39	1.9	88.7
Control Area (19 Stations):			
1	14.45	76.1	76.1
2	1.27	6.7	82.8
3	.89	4.7	87.4
4	.59	3.1	90.5
5	.37	1.9	92.4

2.6 Response Information from Principal Components

The information content of the first few principal components of the data is analyzed below. Separate band precipitation means (and band precipitation standard deviations) were estimated from the stations included in the PCA data over Target and Control

Areas. These values were used as dependent variables and were regressed on the first few principal component values for the Target and Control Areas (The first six principal components for the Target Area and the first five principal components for the Control Area). Generally means and standard deviations of precipitation measurements for experimental units are positively (but not perfectly) correlated. It is possible though, for cloud seeding to affect the scale parameter of the distribution without affecting the location parameter, so standard deviations were also included as dependent variables in similar regressions. The linear regression results are reported in Table 2.

The regression results confirm that the first few components yield near-perfect predictions of the means. Although it is not reported in Table 2, the first principal component alone accounted for most of the variance in band means. The R^2 for simple regressions of the means on the first principal component were .997 for the Target Area and .985 for the Control Area. Thus the first principal component generally reflects the summary information in the band means and the second and other principal components reflect further summary response information.

Values of R^2 for the standard deviations are lower but the association with the first few principal components is still quite strong. Here, the first principal component is again strongly associated with the standard deviations but other components are also important.

The statistics given in Table 2 demonstrate the efficacy of the principal components as summary response measures for precipitation. Response-surface integrated volumes were not directly considered because these values are highly correlated with the simple band means (Bradley, Srivastava, and Lanzdorf; 1977).

2.7 Interpreting of the Principal Components

As mentioned above, principal components are not always interpretable as recognizable constructs. In the present case

TABLE 2: REGRESSION RESULTS PREDICTING MEANS AND STANDARD DEVIATIONS FROM PRINCIPAL COMPONENT VECTORS

Dependent Variable	Adj. R^2	F (df_1, df_2)	MSE	Const.	Equation Coefficients (Ind. Vars. are Prin. Comp. Scores) PCS1	PCS2	PCS3	PCS4	PCS5	PCS6
Target Area:										
Mean	.998	7,987 (6, 100)	.000	.251	.283	.002	.004	-.000	-.003	-.005
Std. Dev.	.888	141.1 (6, 100)	.002	.167	.145	.021	.015	.002	-.020	-.004
Control Area:										
Mean	.989	1,900 (5, 101)	.000	.242	.197	.006	-.002	.007	.006	---
Std. Dev.	.689	47.5 (5, 101)	.002	.117	.058	.025	-.006	-.010	.012	---

however, the results do yield readily interpretable results. The station-component correlation estimates ($r_{ki} = \hat{a}_{ki}\sqrt{\hat{\lambda}_k}$) for the first three components of both Target and Control Areas are given in Figures 1 through 6. The left side of the horizontal bars represent station locations in degrees and hundredths and the vertical spikes represent the r_{ki} or the simple correlation between the k^{th} component and the i^{th} station (the scale is 2 inches equals a correlation of 1.0). Correlations between station precipitations and the first component (Figures 1 and 4) are large for all stations in both areas. For the second component (Figures 2 and 5), the correlations are associated with the location of the stations relative to the coast. The signs are opposite for the inland stations relative to the coastal stations. Given the topography of the Santa Barbara area (i.e., mountain ridges along the coast), this component is interpreted as an orographic component of precipitation. This pattern holds for both Target and Control Areas, as does the third component pattern (Figures 3 and 6).

The magnitudes and signs of the correlations for the third component vary directly with the East-West location of the stations. Again, the pattern is clearly present for both Target and Control areas. The patterns for the other principal components are not clearly interpretable and are not displayed, but these components are relatively unimportant since most of the variance is associated with the first three components.

2.8 Selecting Key Stations

The final part of this section reports on the use of PCA to select a small subset of key stations that can be used reproduce summary response measures.

A subset of stations that were highly correlated with the second through the sixth components were selected (The first component was not considered because it is highly correlated with

FIGURE 1: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 1 BY STATIONS, TARGET AREA.

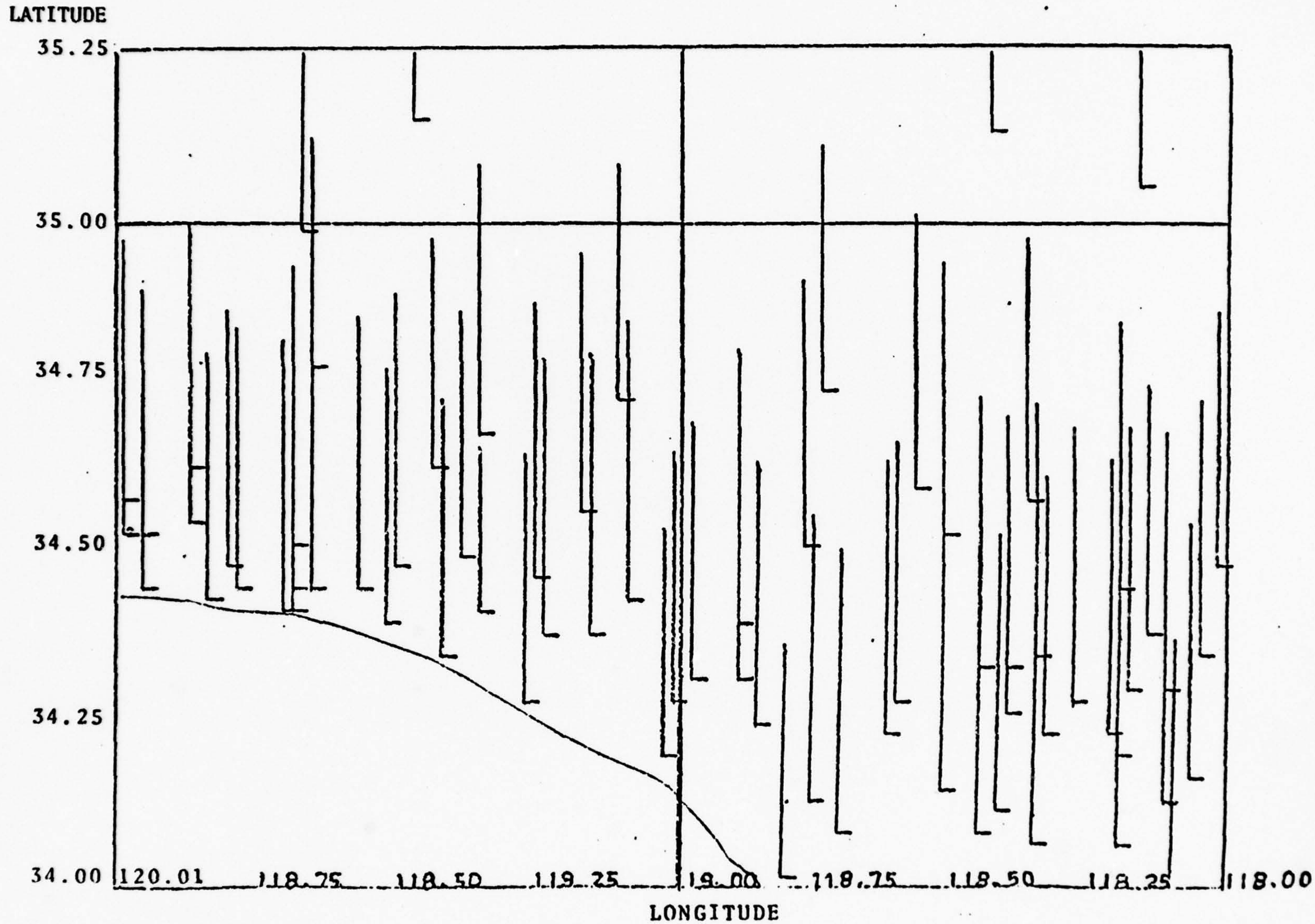


FIGURE 2: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 2 BY STATIONS, TARGET AREA.

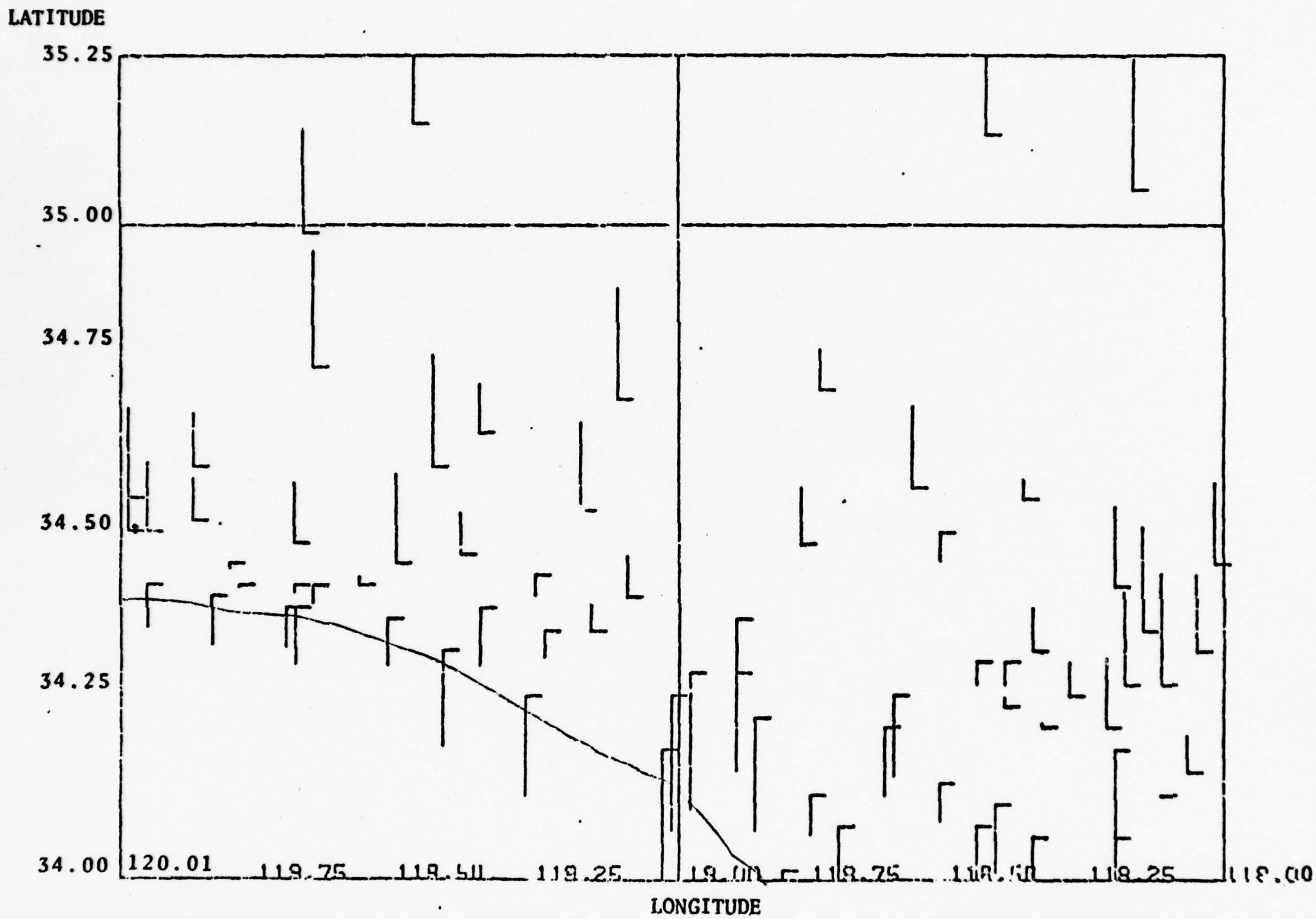


FIGURE 3: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 3 BY STATIONS, TARGET AREA.

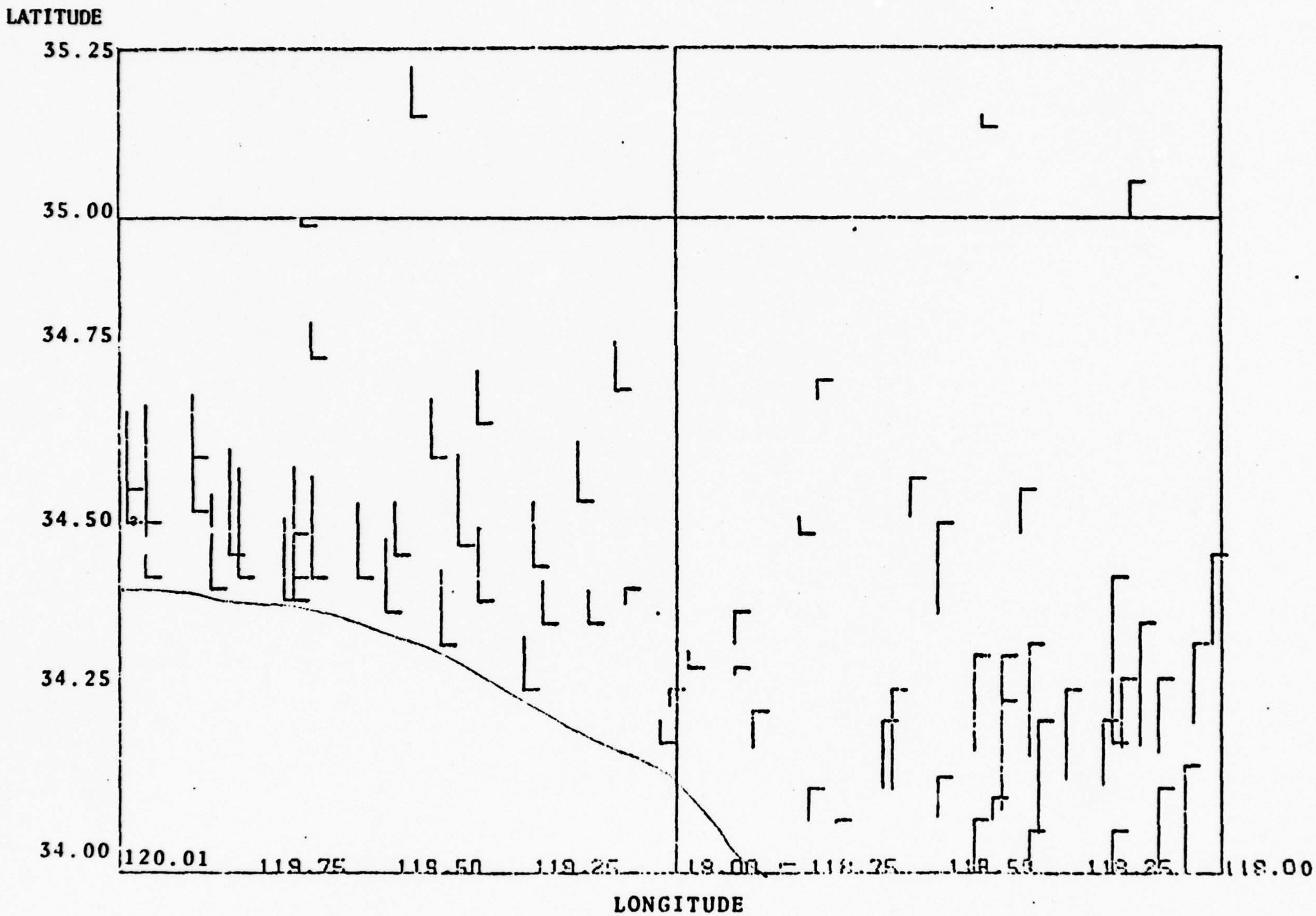


FIGURE 4: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 1 BY STATIONS, CONTROL AREA.

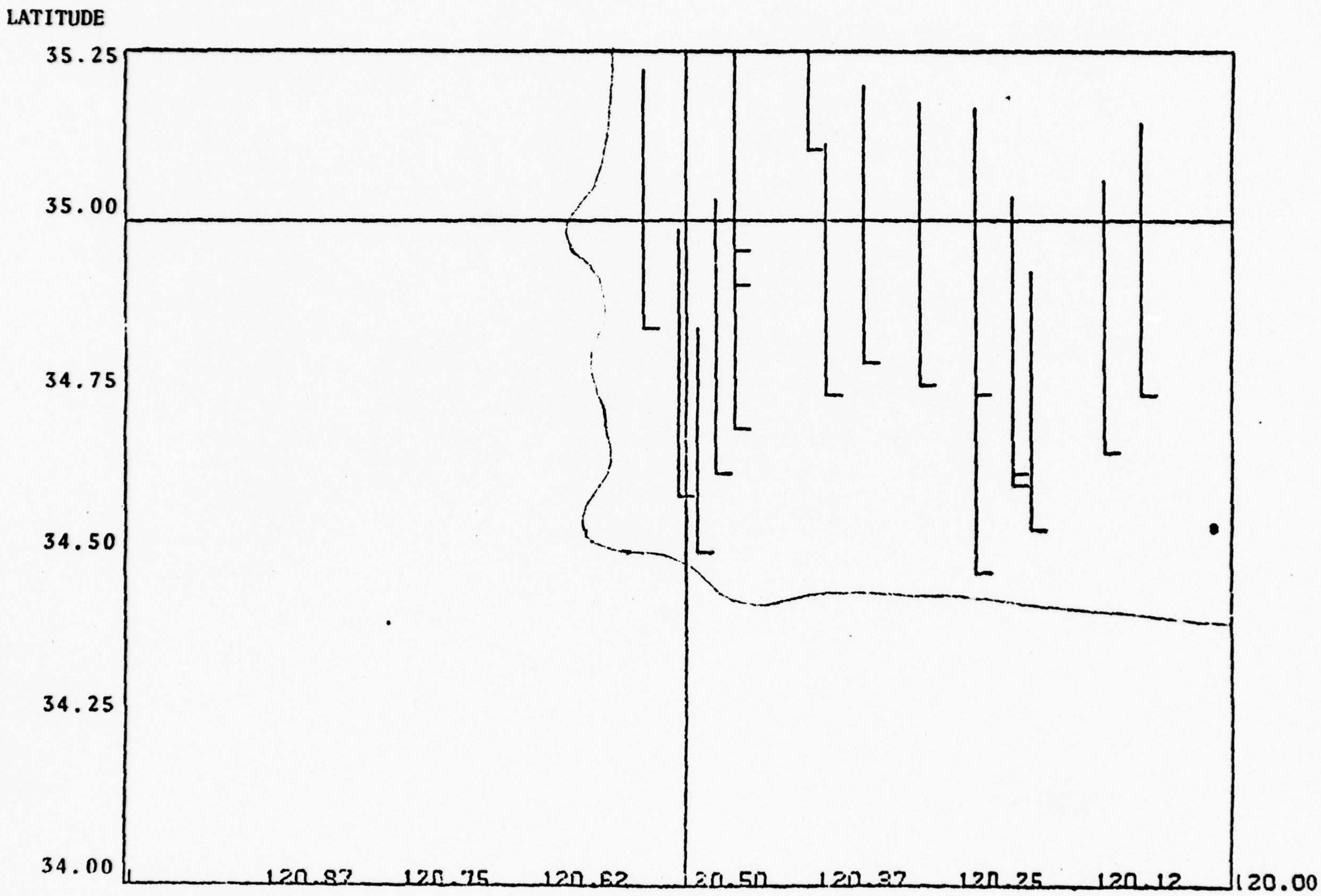


FIGURE 5: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 2 BY STATIONS, CONTROL AREA.

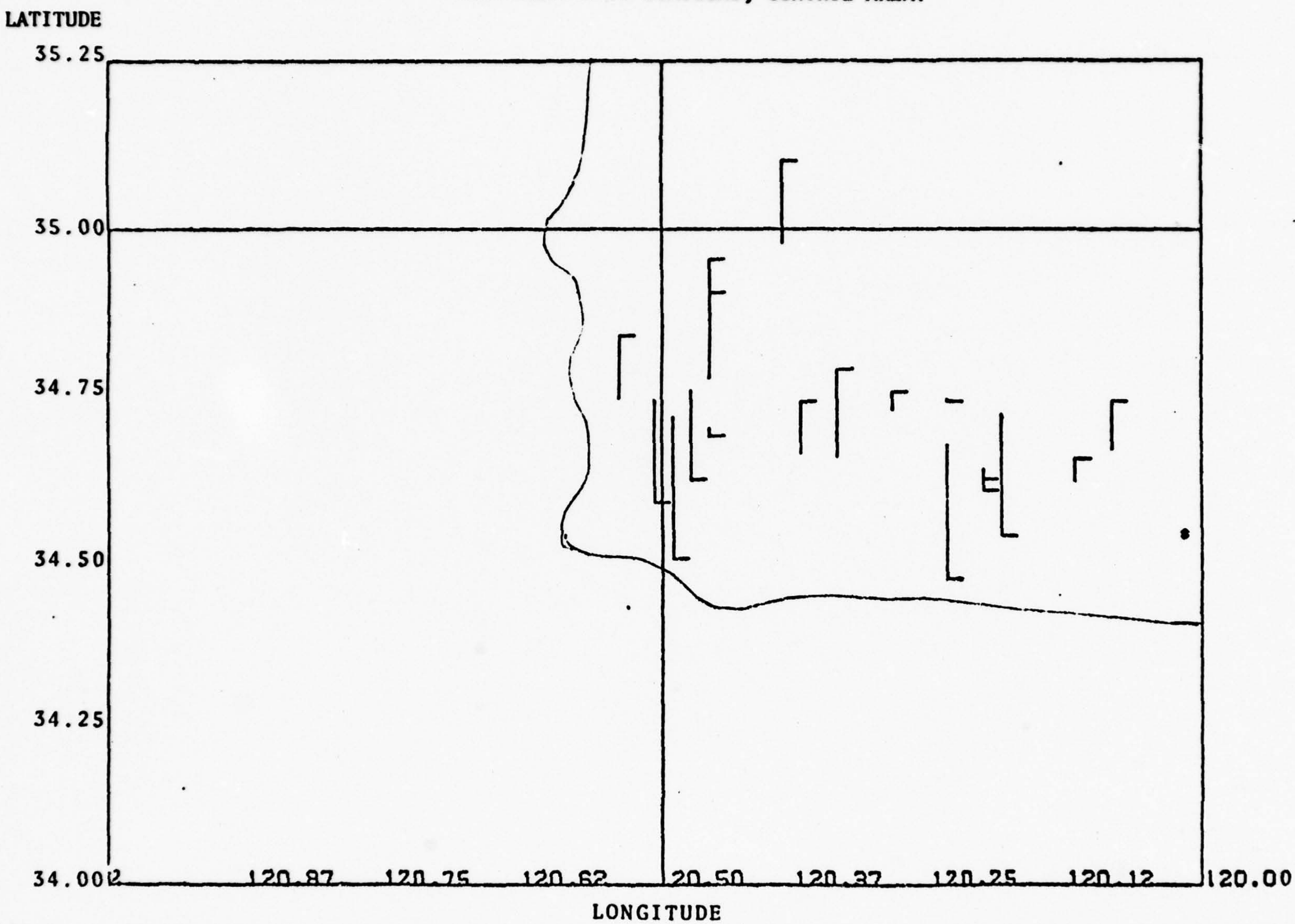
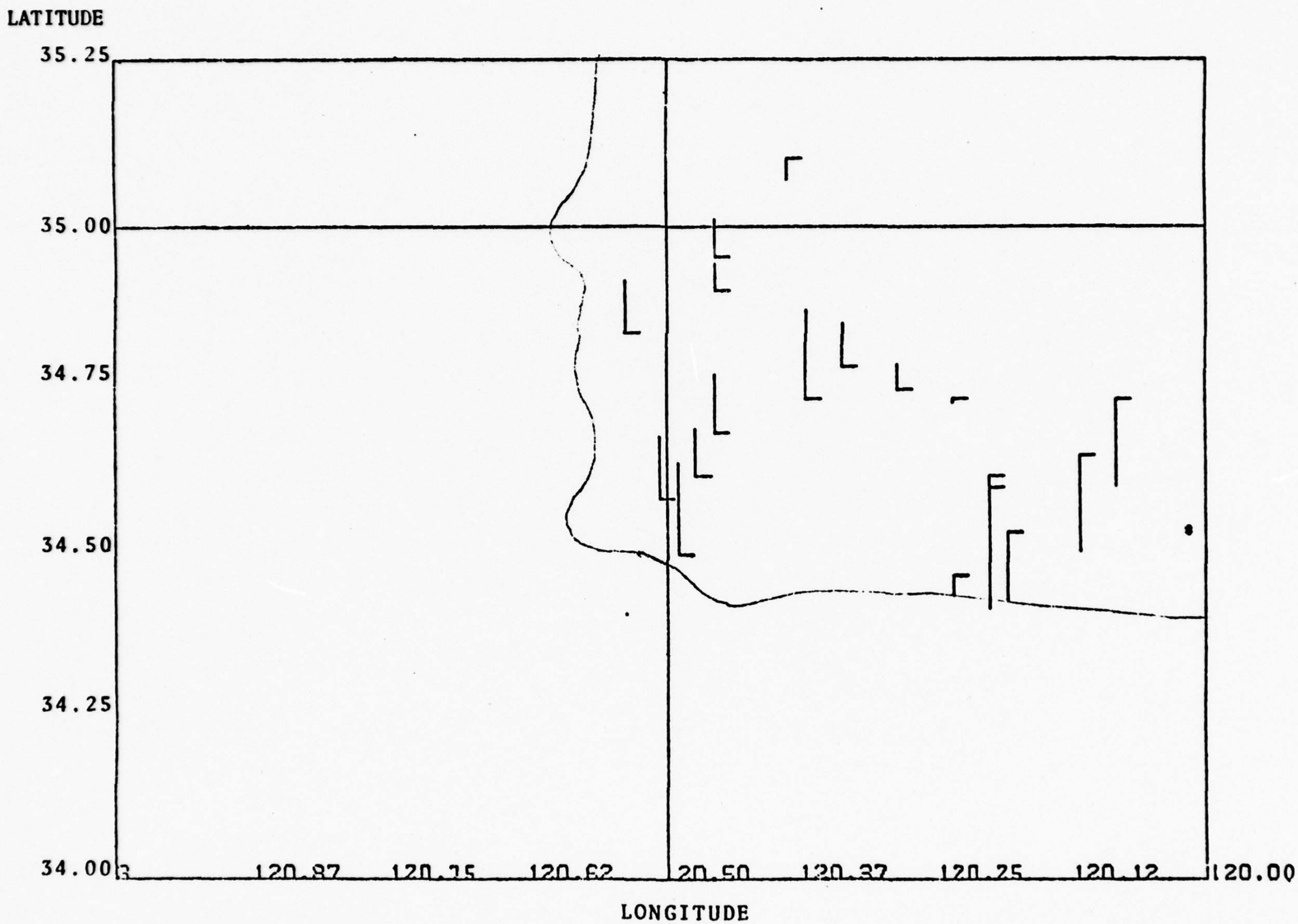


FIGURE 6: CORRELATIONS BETWEEN PRECIPITATION AND PRINCIPAL COMPONENT 3 BY STATIONS, CONTROL AREA.



most stations). For the Target Area, two stations were selected for each of the five components and for the Control Area only one station was selected for each component. Two other objectives were considered in addition to maximization of the correlation for the Target Area stations: (i) Stations with fewer missing values were chosen where several stations had nearly-equal correlations; (ii) For the second station in the Target Area, the station was also chosen to be geographically separated from the first station. The selected stations are given in Table 3 along with station-component correlations. In both the Target and Control stations, some stations were highly correlated with two of the components. This resulted in only eight key Target Area stations and four key Control Area stations.

The station-component correlations are not the primary concern here. These key station measurements should reproduce the summary response measures if this approach is to be useful. The results for a series of regressions on these key stations are reported in Table 3.

For the Target regressions, the values of the simple correlation coefficients are good (but not outstanding) for the means, standard deviations, and the first two principal components. This suggests that, if means are chosen as the summary measure, this approach may be useful in reducing the number of data collection points for large areas. The results on the standard deviation and the second through the sixth component are not adequate for reliable summarization.

It is almost certain that better results could be obtained here by the inclusion of stations that are highly correlated with the first principal component (several station/first-component correlations exceeded .95). All stations in the regressions necessarily had lower-than-average correlations with the first principal component because of their higher-than-average correlations with components orthogonal to the first component. Again, this conjecture was not tested here but should be considered in any

TABLE 3: STATIONS SELECTED TO REPRESENT PRINCIPAL COMPONENTS

Key St. Number	Name, (SBA No.)	Lat.	Long.	Alt. (m)	No. Miss. Bands	Correlations with PC No.:* 1	2	3	4	5	6
Target:											
KEYTG 1	E3751(29)	34.27	118.40	335	0	.877	.030	-.364*	-.030	.057	-.111
KEYTG 2	E7735(40)	34.75	118.73	1377	8	.790	.127	-.064	.459*	.037	-.225*
KEYTG 3	E8752(47)	35.15	119.47	312	4	.648	.364	.158	.028	.277*	.245
KEYTG 4	S211(130)	34.45	119.78	122	3	.858	-.008	.364*	.012	.236	-.039
KEYTG 5	S221(134)	34.98	119.67	662	3	.750	.340	.020	.034	.285*	.218*
KEYTG 6	S238(141)	34.78	119.65	1527	14	.745	.381	.115	.414*	-.109	.004
KEYTG 7	V168(154)	34.20	118.20	11	2	.670	-.480*	.217	.289	-.028	-.147
KEYTG 8	V190(164)	34.28	119.00	168	4	.841	-.447*	.050	.074	-.093	.066
Control:											
KEYCN 1	E4144(30)	35.01	120.38	218	10	.823	-.274	-.068	.065	.302*	.340*
KEYCN 2	N01 (103)	34.83	120.53	91	12	.848	-.203	.177	.319*	-.123	-.094
KEYCN 3	N04 (106)	34.60	120.20	104	4	.891	.034	-.401*	.047	.095	-.099
KEYCN 4	S206(127)	34.47	120.23	9	7	.804	.444*	-.064	.021	-.112	.038

*The highest correlations (the primary basis for selecting these stations) are asterisked for the stations.

TABLE 4: REGRESSIONS ON KEY STATIONS

Sum. Stat. and Ind. Var.	Mean	Std. Dev.	PCS1*	PCS2*	PCS3*	PCS4*
Target:						
Adj. R^2	.902	.735	.908	.710	.574	.403
MSE	.007	.005	.081	.256	.371	.522
F**	122.3	37.8	130.9	33.5	18.7	9.9
KEYTG 1	.405	.163	1.407	-.107	-3.112	-1.291
KEYTG 2	.002	.046	-.024	.539	-.183	.544
KEYTG 3	-.056	-.044	-.153	.241	-.661	.659
KEYTG 4	.200	.057	.686	-.506	1.549	-1.134
KEYTG 5	.351	.040	1.445	2.252	.606	-2.332
KEYTG 6	.138	.188	.452	2.409	1.145	2.925
KEYTG 7	.104	.041	.416	-1.269	.688	.768
KEYTG 8	.083	.048	.280	-1.052	.229	.551
Constant	.026	.059	-.799	-.090	-.123	-.073
Control:						
Adj. R^2	.646	.359	.674	.214	.174	.126
MSE	.013	.004	.297	.753	.822	.975
F**	49.4	15.8	55.9	8.2	6.6	4.83
KEYCN 1	.123	.037	.565	-.291	-.044	.472
KEYCN 2	.146	.021	.781	-.347	.924	.649
KEYCN 3	.258	.084	1.443	-.336	-1.173	-.984
KEYCN 4	.129	.059	.576	1.689	-.608	.841
Constant	.127	.076	-.588	-.236	.110	.020

*PCSi is the i^{th} Principal Component Score.

**All regressions were run on all 107 bands so the F statistic is based on 8 and 98 degrees of freedom for the Target regressions and on 4 and 102 degrees of freedom for the Control regressions.

subsequent work that attempts to use selected stations for the summarization of precipitation. The results on the Control area stations are poor enough to indicate that the key station approach is not useful for smaller areas and smaller numbers of stations.

In summary, the key-station approach as used here had limited utility for reducing costs in weather modification experiments. However, for large areas, if the mean is to be used as the summary response measure, the approach could be useful, and probably could be improved on by inclusion of stations with high first-component correlations.

3. MULTIVARIATE ANALYSES OF CLOUD-SEEDING EFFECTS

The models that are covered below do not exhaust the multivariate application in the analysis of data from cloud-seeding experiments. The applications reported here ignore approaches that use concomitant variables because there are indications that the covariates from the SBA-I data were contaminated by the seeding operations (Bradley, Srivastava, and Lanzdorf; 1977). In a forthcoming technical report I have developed alternative methods of analysis (canonical correlation and multivariate analysis of covariance) that incorporate the covariates to reduce error variance in tests of the effects of seeding.

This section considers two methods of analysis that rely on PCA and in each case, the methods are applied to the SBA-I data. This precipitation data obviously violates the assumptions that are necessary for parametric tests of significance, but some of the familiar statistics are produced as descriptive measures.

The multivariate precipitation measurements could respond to seeding in several ways. Cloud-seeding could have no effect, it could affect the means of the vectors of precipitation measurements while leaving the covariances between stations unchanged, it could leave the means unaffected but have an effect on the

covariance structure, or both means and covariances could be affected by seeding. If seeding has no effect, then the principal components, and vectors of principal component scores, estimated from all available observations should be essentially the same for the seeded and unseeded experimental units.

If however, seeding affects the means and/or covariances, the analysis should consider summary measures that are estimated separately for the seeded and nonseeded observations. The two subsections below present analyses based on these alternative assumptions.

4.1 Analysis of Principal Components from Pooled-Data Covariance Matrices

The discussion and results in Section 3 implicitly assume that the means and the covariance structures are identical for seeded observations and unseeded observations. If this is true, the means of the principal component score vectors should be the same for seeded and unseeded observations. Thus a simple test for the effects of seeding would be to test the hypothesis that the mean vector of principal component scores for seeded observations equals the mean vector of principal component scores for unseeded observations.

It is possible that scores for some components have different means although the vectors of means do not differ significantly. For example, univariate tests of the orographic component scores could indicate differences for seeded and unseeded bands even though a vector test could obscure a significant difference. The subsections below describe methods for the analysis of vectors of scores and for the analysis of univariate scores as well.

4.1.1 A Multivariate Comparison of Principal Component Scores

Hotelling's T^2 statistic is an appropriate test statistic for testing the hypothesis that $\underset{\sim}{\mu}_1 = \underset{\sim}{\mu}_2$ when the two populations of interest have multivariate normal distributions with a common

covariance matrix, $\underset{\sim}{\Sigma}$, of full rank (the location vectors may differ, however). These assumptions do not hold for the principal components scores of precipitation data, especially when the principal components are extracted from the correlation matrix (see Morrison (1976) for a discussion of the distributional problems here). Nonetheless, if these limitations are recognized as one interprets the results, Hotelling's T^2 statistic can indicate similarities in the vectors of mean principal component scores, since a true null hypothesis would not be rejected although the power to reject a false null hypothesis is limited.

For the principal component results given in Section 3, Hotelling's T^2 was computed to compare the vectors of the means of the first three principal component scores for the Target Area, the computed T^2 value corresponded to an F-ratio of 1.016 with 3 and 103 degree of freedom (At $\alpha = .05$ the critical value of F is 2.7 with 3 and 100 degrees of freedom). If the distributional assumptions held, this result would indicate negligible effects for seeding.

4.1.2 Univariate Comparisons of Principal Component Scores

As the introduction to this section notes, univariate comparisons could indicate differences for the means of the individual components that get "washed out" in the multivariate statistics. Of course if a series of univariate tests of significance are produced, such multiple-comparison tests suffer from a loss of power. In the present case, the data do not meet the usual assumptions for tests of significance, so the statistics are produced for descriptive purposes only.

The t-statistics (the difference in the estimated mean principal component scores for seeded and nonseeded data, divided by the pooled standard deviations of the principal component scores) for the principal component scores of the Target Area are given in Table 5. Only the first component means are very different and this indicates that if there are differences in

the principal components from the pooled data, the differences seem to be associated with the band means.

TABLE 5: UNIVARIATE T-STATISTICS FOR THE FIRST THREE PRINCIPAL COMPONENT SCORES FROM THE POOLED TARGET AREA DATA

Component	t-Statistics (N = 107 bands)
1	1.67
2	.52
3	.07

This concludes comparisons of the seeded and nonseeded subsets of components based on a pooled-data set. The next subsection presents results obtained when the data was split into seeded and unseeded bands to produce two sets of principal component estimates.

4.2 The Effects of Seeding on the Covariance Structure

Separate PCA estimates (one from the seeded experimental units and one from the unseeded experimental units) can provide insight into the effects, if any, of cloud-seeding on the covariance structure of the precipitation measurements. First, the data from the stations are separated, then standardized in the manner of Section (2.1) to produce separate estimates of correlation matrices for the seeded and unseeded observations. The principal components estimated from these correlation matrices should reflect changes, if any, in the station-to-station covariances that are produced by seeding. Tests for significant differences are again limited since the data does not meet the requisite assumptions for tests of significant differences.

A summary of the results on the estimated eigenvalues for the seeded and unseeded data sets as well as the previously-reported results on the combined data set are given in Table 6.

TABLE 6: EIGENVALUES AND PERCENT VARIANCE ASSOCIATED WITH THE PRIMARY PRINCIPAL COMPONENTS FROM THE SEEDED-DATA, UNSEEDED-DATA AND COMBINED DATA.

Comp.	Seeded Data Only (N=56)			Unseeded Data Only (N=51)			Combined Data (N=107)		
Comp. No.	Eigen-Value	% Var.	Cum. % Var.	Eigen-Value	% Var.	Cum. % Var.	Eigen-Value	% Var.	Cum. % Var.
Target Area (72 Stations)									
1	53.1	73.7	73.7	48.7	67.7	67.7	51.3	71.3	71.3
2	4.9	6.8	80.5	7.4	10.2	77.9	4.8	6.9	78.0
3	4.2	5.8	86.2	4.3	6.0	83.9	4.2	5.9	83.8
4	2.2	3.1	89.3	2.7	3.7	87.6	2.1	2.9	86.7
5	1.3	1.9	91.2	2.0	2.7	90.3	1.4	1.9	88.7
Control Area (19 Stations)									
1	14.7	77.4	77.4	14.4	75.8	75.8	14.5	76.1	76.1
2	1.4	7.5	84.9	1.4	7.4	83.2	1.3	6.7	82.8
3	.8	4.3	89.2	.9	4.9	88.1	.9	4.7	87.4
4	.5	2.8	91.9	.6	3.3	91.4	.6	3.1	90.5
5	.4	1.9	93.9	.3	2.0	93.4	.4	1.9	92.4

This table shows that the first seeded vs. nonseeded eigenvalues differ by 6% of the total variance for the Target Area versus 1.6% the total variance for the Control Area. Even when the requisite assumption of multivariate normality holds, the variances of the sampling distributions are so large that the Target Area difference would be a nonsignificant difference (Press 1972). The results do indicate that the seeding operations produced precipitation measurements over the Target Area raingage network that were more correlated with the first component (and thus, the band means) of the precipitation and further, the measurements were less correlated with the second (orographic) component. The same result does not hold for the control area data where the differences were less marked for all components.

The changes in the first two eigenvalues could be accompanied by changes in the patterns of station-component correlations (as in Figure 1-6). Although graphs are not reproduced here because of space considerations, the basic patterns of signs for the first three components were similar to the patterns of signs in Figures 1-6 for both the seeded and nonseeded component estimates. Of course, the relative heights of the spikes (which represent the stations-to-component correlations) changed to reflect increases or decreases in correlations.

In conclusion, the proposed analysis and the results obtained with SBA-I data suggest that analyses of weather modification data should consider the effects of seeding on the covariance structure of the precipitation measurements. The data here represent such gross violations of the requisite assumptions for inference that no conclusions can be reached on the effects of seeding on the covariance structure of precipitation measurements. In general, the nature of the distributions of precipitation measurements precludes tests based on assumptions of normality.

5. CONCLUSIONS AND IMPLICATIONS

As is the case with many other analyses of weather modification data, the conclusions are limited and the implications for further analysis nearly boundless. The premise that multivariate models can be applied to data from weather modification data is supported by the results here.

The applications of PCA to precipitation measurements produced readily-interpretable principal components. For both Control and Target Areas, the first components were almost perfectly correlated with the simple average of the experimental units, the second component was readily interpreted as an orographic component, while the third component was identified as an east-west component. The use of PCA to select a subset of key stations has utility for large areas but the method produced inadequate summary measures for small areas with few stations.

The use of multivariate methods to analyze the effects of cloud-seeding is also limited. The data, particularly the standardized co-variance matrix (i.e. the correlation matrix) fails to meet the multivariate-normality assumption so that the results do not allow the usual inferences as to the effects of cloud-seeding. The estimates obtained from the SBA-I data indicate that the seeded bands produced precipitation measurements that are uniformly more highly correlated with the band means than the measurements for the unseeded bands.

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APPENDIX

This Appendix provides detailed information from the principal-components results. The results are organized by Target Area and Control Area as well as whether the estimates were based on all bands, nonseeded bands only, or seeded bands only. The first Tables give descriptions of the stations and the other tables give: means and standard deviations; communalities and eigenvalues for the principal components; station-to-component correlations; as well as the station-to-station correlation matrix (For the correlation matrices, in the interest of space, only the correlations that are based on all bands are given. Copies of the nonseeded-and seeded-band correlation matrices are available on request).

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Table A.1.T. TARGET AREA STATIONS USED IN THE PRINCIPAL COMPONENT ANALYSIS

STATION NAME	NO. MISSING BANDS	ORIG. STAT. NUMBER	LATITUDE (DEG,.01S)	LONGITUDE (DEG,.01S)	ALTITUDE (METERS)
E1253	7	25	34.58	119.98	238
E1682	0	26	34.23	118.62	276
E3751	0	29	34.27	118.40	335
E5756	20	36	35.05	118.17	834
E7735	8	40	34.75	118.73	1377
E8752	4	47	35.15	119.47	312
E8832	20	48	35.13	118.43	1207
L0010	22	55	34.08	118.45	178
L0011	6	56	34.12	118.42	264
L0033	1	57	34.33	118.40	457
L0046	4	58	34.30	118.18	706
L0053	0	59	34.30	118.12	1104
L0054	22	60	34.35	118.05	1319
L0128	18	62	34.60	118.57	633
L0179	4	64	34.17	118.07	360
L0191	4	65	34.07	118.20	122
L0213	1	68	34.07	118.35	53
L0250	15	69	34.45	118.20	800
L0259	2	70	34.28	118.60	389
L0292	13	72	34.15	118.52	328
L0303	1	73	34.13	118.12	244
L0372	3	75	34.53	118.52	482
L0373	7	76	34.23	118.22	678
L0434	13	77	34.13	118.75	244
L0435	10	78	34.08	118.70	183
L0458	6	79	34.02	118.80	35
L0466	5	80	34.35	118.35	982
L0694	5	83	34.28	118.28	465
L1014	3	86	34.00	118.10	52
L1017	12	87	34.48	118.02	1000
L1074	17	88	34.38	118.15	1707
L1107	9	89	34.23	118.33	354
L1181	18	91	34.33	118.45	1495
M 124	4	98	34.58	118.37	930
M 225	12	99	34.42	119.68	2
M 226	10	100	34.45	119.95	34
M 228	1	101	34.45	119.68	262
M 230	2	102	34.52	119.68	473
N 13	4	112	34.53	119.95	1220
N 14	4	113	34.63	119.87	348
N 15	9	114	34.55	119.87	282
N A	19	120	34.53	120.02	1067

Table A.1.T. (Continued)

STATION NAME	NO. MISSING BANDS	ORIG. STAT. NUMBER	LATITUDE (DEG,.01S)	LONGITUDE (DEG,.018)	ALTITUDE (METERS)
N B	3	121	34.43	119.83	3
S 208	10	128	34.40	119.52	3
S 210	4	129	34.45	119.65	168
S 211	3	130	34.45	119.78	122
S 221	3	134	34.98	119.67	662
S 231	9	135	34.45	119.57	427
S 232	2	136	34.48	119.50	633
S 234	3	138	34.42	119.70	24
S 238	10	141	34.78	119.65	1524
S 242	19	142	34.48	119.80	305
V 085	21	148	34.38	119.23	335
V 138	14	150	34.63	119.43	1479
V 165	4	151	34.47	119.25	457
V 166	3	152	34.42	119.35	229
V 167	0	153	34.28	119.27	91
V 168	2	154	34.20	118.20	11
V 171	9	157	34.40	118.88	137
V 172	13	158	34.52	118.77	351
V 173	0	159	34.43	119.08	305
V 174	20	160	34.68	119.35	1091
V 190	4	164	34.28	119.00	168
V 191	0	165	34.32	118.88	183
V 192	22	166	34.25	118.85	168
V 194	6	168	34.20	119.02	37
V 198	16	170	34.57	119.17	1055
V 206	4	171	34.32	118.97	183
V 207	18	172	34.50	119.38	500
V 209	6	173	34.73	119.10	1570
V 221	1	174	34.35	119.42	3
V 225	4	176	34.38	119.15	213

Table A.1.C. CONTROL AREA STATIONS USED IN THE PRINCIPAL COMPONENT ANALYSIS

STATION NAME	NO. MISSING BANDS	ORIG. STAT. NUMBER	LATITUDE (DEG,.01S)	LONGITUDE (DEG,.01S)	ALTITUDE (METERS)
E4144	10	30	35.10	120.38	218
E7946	0	43	34.90	120.45	72
N 01	12	103	34.83	120.53	91
N 02	10	104	34.62	120.47	98
N 03	0	105	34.75	120.28	177
N 04	4	106	34.60	120.20	104
N 05	5	107	34.65	120.12	238
N 06	19	108	34.73	120.08	375
S 201	0	122	34.78	120.33	195
S 202	8	123	34.73	120.23	220
S 203	22	124	34.73	120.37	305
S 204	5	125	34.75	120.28	172
S 205	18	126	34.68	120.45	91
S 206	7	127	34.47	120.23	9
S 217	18	133	34.50	120.48	6
S 233	0	137	34.62	120.20	114
S 235	0	139	34.95	120.45	61
S 236	1	140	34.53	120.18	201
S 251	13	144	34.58	120.50	341

Table A.2.TA. Means and Standard Deviations for All Bands: Target Area.

VARIABLE	MEAN	STANDARD DEV	CASES
T001	.2815	.3416	100
T002	.1838	.2368	107
T003	.2034	.2987	107
T004	.0571	.1180	87
T005	.1316	.1982	99
T006	.0582	.0940	103
T007	.0824	.1185	87
T008	.1779	.2675	85
T009	.2135	.3292	101
T010	.2439	.3411	106
T011	.3131	.4890	103
T012	.2926	.4716	107
T013	.1958	.2841	85
T014	.2521	.3399	89
T015	.2388	.3902	103
T016	.1583	.2175	103
T017	.1728	.2548	106
T018	.1225	.1987	92
T019	.1952	.2604	105
T020	.2228	.3819	94
T021	.2153	.3039	106
T022	.1795	.2543	104
T023	.3025	.4283	100
T024	.2655	.3753	94
T025	.2497	.3936	97
T026	.1972	.2870	101
T027	.2366	.3135	102
T028	.2136	.3251	102
T029	.1515	.1986	104
T030	.1002	.1558	95
T031	.2534	.3308	90
T032	.2026	.3328	98
T033	.2176	.2831	89
T034	.1784	.2776	103
T035	.2502	.2988	95
T036	.2358	.2567	97
T037	.3018	.3411	106
T038	.4249	.5730	105
T039	.4018	.4545	103
T040	.2574	.2385	103
T041	.3642	.4292	98
T042	.3686	.4167	88
T043	.2366	.2643	104
T044	.2401	.2996	97
T045	.3096	.3854	103
T046	.2510	.2962	104
T047	.0689	.0929	104
T048	.3518	.4189	98
T049	.5168	.7517	105
T050	.2413	.3017	104
T051	.1838	.2522	97
T052	.3349	.3580	88
T053	.3234	.3901	86
T054	.1922	.2458	93
T055	.2922	.3613	103
T056	.2999	.3558	104
T057	.2034	.2793	107
T058	.1963	.2767	105
T059	.2378	.2825	98
T060	.1940	.2352	94
T061	.3086	.4148	107
T062	.1859	.2638	87
T063	.2084	.2892	103
T064	.2052	.2536	107
T065	.1796	.2443	85
T066	.1672	.2495	101
T067	.3084	.4042	91
T068	.2038	.2554	103
T069	.3631	.4387	89
T070	.1355	.1831	101
T071	.1991	.2467	106
T072	.3003	.3911	103

Table A.2.TN Means and Standard Deviations for Nonseeded Bands: Target Area.

VARIABLE	MEAN	STANDARD DEV	CASES
T001	.2270	.2858	47
T002	.1425	.1884	51
T003	.1490	.2179	51
T004	.0576	.1358	41
T005	.1158	.1910	48
T006	.0429	.0922	49
T007	.0633	.0915	39
T008	.1183	.1864	41
T009	.1525	.2414	48
T010	.1988	.3051	51
T011	.2480	.4171	50
T012	.2106	.3767	51
T013	.1266	.2015	38
T014	.1914	.2844	42
T015	.2008	.3112	50
T016	.1208	.1633	48
T017	.1451	.2112	51
T018	.1034	.1790	44
T019	.1368	.1807	50
T020	.1947	.3690	45
T021	.1737	.2437	51
T022	.1296	.1818	50
T023	.2373	.3563	48
T024	.2360	.3510	45
T025	.1983	.3022	48
T026	.1913	.2914	48
T027	.1878	.2708	49
T028	.1835	.2745	49
T029	.1229	.1596	51
T030	.0798	.1343	45
T031	.1974	.2716	43
T032	.1638	.2988	47
T033	.1550	.1759	44
T034	.1176	.1737	50
T035	.2187	.2446	46
T036	.1946	.1862	48
T037	.2557	.2903	51
T038	.3204	.4140	50
T039	.3244	.3622	48
T040	.2037	.2110	49
T041	.3036	.3899	45
T042	.2760	.3087	40
T043	.1824	.1857	50
T044	.2311	.3142	46
T045	.2490	.3101	49
T046	.2037	.2208	49
T047	.0553	.0856	49
T048	.2860	.3347	47
T049	.4120	.6411	50
T050	.2028	.2572	50
T051	.1467	.1652	45
T052	.2756	.2876	45
T053	.2931	.3952	39
T054	.1591	.1857	43
T055	.2610	.3524	48
T056	.2708	.3573	50
T057	.1802	.2649	51
T054	.1591	.1857	43
T055	.2610	.3524	48
T056	.2708	.3573	50
T057	.1802	.2649	51
T058	.1726	.2942	50
T059	.1915	.2562	48
T060	.1307	.1920	45
T061	.2455	.3577	51
T062	.1578	.2070	40
T063	.1762	.2626	48
T064	.1641	.2144	51
T065	.1707	.2357	42
T066	.1479	.2637	48
T067	.2267	.2954	43
T068	.1508	.1969	49
T069	.2909	.3829	43
T070	.1172	.1873	46
T071	.1720	.1973	51
T072	.2386	.3470	49

Table A.2.TS. Means and Standard Deviations for Seeded Bands: Target Area.

VARIABLE	MEAN	STANDARD DEV	CASES
T001	.3298	.3806	53
T002	.2214	.2698	56
T003	.2529	.3516	56
T004	.0567	.1011	46
T005	.1465	.2055	51
T006	.0720	.0944	54
T007	.0979	.1355	48
T008	.2334	.3176	44
T009	.2687	.3863	53
T010	.2856	.3693	55
T011	.3745	.5451	53
T012	.3673	.5364	56
T013	.2517	.3279	47
T014	.3064	.3776	47
T015	.2747	.4525	53
T016	.1909	.2526	55
T017	.1985	.2891	55
T018	.1400	.2155	48
T019	.2484	.3081	55
T020	.2486	.3955	49
T021	.2538	.3485	55
T022	.2257	.3010	54
T023	.3627	.4810	52
T024	.2927	.3980	49
T025	.3000	.4638	49
T026	.2026	.2856	53
T027	.2817	.3447	53
T028	.2415	.3662	53
T029	.1791	.2282	53
T030	.1186	.1722	50
T031	.3047	.3725	47
T032	.2382	.3606	51
T033	.2789	.3498	45
T034	.2358	.3404	53
T035	.2971	.3402	49
T036	.2761	.3073	49
T037	.3445	.3800	55
T038	.5198	.6764	55
T039	.4695	.5158	55
T040	.2967	.2548	54
T041	.4157	.4574	53
T042	.4458	.4785	48
T043	.2869	.3139	54
T044	.2482	.2887	51
T045	.3646	.4384	54
T046	.2931	.3466	55
T047	.0811	.0981	55
T048	.4125	.4791	51
T049	.6120	.8342	55
T050	.2770	.3362	54
T051	.2160	.3064	52
T052	.3970	.4138	43
T053	.3485	.3882	47
T054	.2206	.2865	50
T055	.3195	.3700	55
T056	.3269	.3556	54
T057	.2245	.2927	56
T058	.2178	.2605	55
T059	.2822	.3014	50
T060	.2522	.2571	49
T061	.3661	.4563	56
T062	.2098	.3041	47
T063	.2365	.3102	55
T064	.2427	.2814	56
T065	.1884	.2549	43
T066	.1847	.2371	53
T067	.3815	.4726	48
T068	.2519	.2924	54
T069	.4307	.4795	46
T070	.1509	.1797	55
T071	.2242	.2846	55
T072	.3563	.4225	54

TABLE A.2.C. Means and Standard Deviations for All Bands, Non-seeded Bands, and Seeded Bands: Control Area.

ALL BANDS

VARIABLE	MEAN	STANDARD DEV	CASES
C01	.2433	.2474	97
C02	.1745	.1984	107
C03	.1764	.2028	95
C04	.2526	.2460	97
C05	.2030	.1821	107
C06	.2095	.2211	103
C07	.1844	.1765	102
C08	.2233	.2116	88
C09	.2050	.1820	107
C10	.2208	.1914	99
C11	.2433	.1896	85
C12	.2286	.2011	102
C13	.1906	.1564	89
C14	.2248	.2270	100
C15	.2798	.2828	89
C16	.2359	.2325	107
C17	.1787	.1845	107
C18	.3512	.4003	106
C19	.2897	.2605	94

Table A.2.C. Means and Standard Deviations for All Bands, Non-seeded Bands, and Seeded Bands: Control Area. (Continued).

NOT SEEDED BANDS

VARIABLE	MEAN	STANDARD DEV	CASES
C01	.2234	.2571	47
C02	.1753	.2074	51
C03	.1630	.1761	46
C04	.2224	.1876	45
C05	.1980	.1731	51
C06	.2072	.2092	51
C07	.1722	.1665	49
C08	.2086	.2039	44
C09	.1971	.1617	51
C10	.2074	.1686	47
C11	.2455	.1918	40
C12	.2298	.1933	49
C13	.1895	.1442	41
C14	.1940	.1795	47
C15	.2345	.1987	44
C16	.2210	.2179	51
C17	.1790	.1859	51
C18	.2840	.3097	50
C19	.2511	.2049	45

SEEDED BANDS

VARIABLE	MEAN	STANDARD DEV	CASES
C01	.2620	.2389	50
C02	.1737	.1917	56
C03	.1890	.2262	49
C04	.2787	.2865	52
C05	.2075	.1913	56
C06	.2167	.2340	52
C07	.1957	.1861	53
C08	.2380	.2204	44
C09	.2121	.1999	56
C10	.2329	.2108	52
C11	.2413	.1898	45
C12	.2275	.2099	53
C13	.1915	.1676	48
C14	.2571	.2608	53
C15	.3240	.3426	45
C16	.2495	.2462	56
C17	.1784	.1848	56
C18	.4112	.4612	56
C19	.3251	.3005	49

Table A.3.TA. Communalities and Eigenvalues for All Bands: Target Area.

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
T001	.93343	1	51.33061	71.3	71.3
T002	.95794	2	4.80180	6.7	78.0
T003	.92285	3	4.23604	5.9	83.8
T004	.83664	4	2.07392	2.9	86.7
T005	.89780	5	1.39353	1.9	88.7
T006	.82627	6	.99920	1.4	90.0
T007	.65697	7	.80870	1.1	91.2
T008	.93080	8	.73992	1.0	92.2
T009	.93560	9	.58893	.8	93.0
T010	.89906	10	.55813	.8	93.8
T011	.94070	11	.54889	.8	94.6
T012	.94070	12	.51317	.7	95.3
T013	.91895	13	.45599	.6	95.9
T014	.92754	14	.40873	.6	96.5
T015	.91806	15	.40598	.6	97.0
T016	.94145	16	.31322	.4	97.5
T017	.93517	17	.30512	.4	97.9
T018	.93789	18	.27041	.4	98.3
T019	.95794	19	.24712	.3	98.6
T020	.96292	20	.21995	.3	98.9
T021	.94145	21	.21188	.3	99.2
T022	.90220	22	.18759	.3	99.5
T023	.93478	23	.15797	.2	99.7
T024	.96292	24	.15614	.2	99.9
T025	.93682	25	.14642	.2	100.1
T026	.90208	26	.13098	.2	100.3
T027	.89540	27	.12569	.2	100.5
T028	.95486	28	.11424	.2	100.6
T029	.90748	29	.10943	.2	100.8
T030	.93789	30	.09550	.1	100.9
T031	.93621	31	.08753	.1	101.0
T032	.95486	32	.08524	.1	101.1
T033	.93526	33	.07719	.1	101.3
T034	.88216	34	.07143	.1	101.4
T035	.96371	35	.06195	.1	101.4
T036	.92724	36	.05601	.1	101.5
T037	.96520	37	.05203	.1	101.6
T038	.93373	38	.04521	.1	101.7
T039	.95533	39	.03881	.1	101.7
T040	.86066	40	.03418	.0	101.8
T041	.92108	41	.03102	.0	101.8
T042	.95533	42	.02751	.0	101.8
T043	.92724	43	.02653	.0	101.9
T044	.90045	44	.02165	.0	101.9
T045	.96148	45	.02096	.0	101.9
T046	.92960	46	.01782	.0	102.0
T047	.82627	47	.01548	.0	102.0
T048	.94534	48	.01181	.0	102.0
T049	.93373	49	.01005	.0	102.0
T050	.96520	50	.00844	.0	102.0
T051	.89267	51	.00552	.0	102.0
T052	.92960	52	.00330	.0	102.0
T053	.94969	53	.00200	.0	102.0
T054	.89267	54	-.00048	-.0	102.0
T055	.94969	55	-.00330	-.0	102.0
T056	.93448	56	-.00658	-.0	102.0
T057	.88490	57	-.01085	-.0	102.0
T058	.84097	58	-.01358	-.0	102.0
T059	.93020	59	-.01967	-.0	102.0
T060	.90254	60	-.02359	-.0	101.9
T061	.96100	61	-.02946	-.0	101.9
T062	.89780	62	-.03364	-.0	101.8
T063	.93337	63	-.03858	-.1	101.8
T064	.93020	64	-.04271	-.1	101.7
T065	.93028	65	-.06528	-.1	101.6
T066	.86447	66	-.07880	-.1	101.5
T067	.89531	67	-.09325	-.1	101.4
T068	.93337	68	-.12181	-.2	101.2
T069	.89668	69	-.16650	-.2	101.0
T070	.86147	70	-.19940	-.3	100.7
T071	.88490	71	-.25129	-.3	100.4
T072	.96100	72	-.26564	-.4	100.0

Table A.3.TN. Communalities and Eigenvalues for Nonseeded Bands: Target Area.

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
T001	.93946	1	48.71999	67.7	67.7
T002	.96804	2	7.36707	10.2	77.9
T003	.90888	3	4.31830	6.0	83.9
T004	.91913	4	2.65997	3.7	87.6
T005	.87217	5	1.95168	2.7	90.3
T006	.89271	6	1.64288	2.3	92.6
T007	.81226	7	1.19896	1.7	94.2
T008	.95847	8	.91036	1.3	95.5
T009	.95847	9	.86953	1.2	96.7
T010	.80124	10	.70233	1.0	97.7
T011	.93644	11	.60846	.8	98.5
T012	.95163	12	.59521	.8	99.4
T013	.87874	13	.53239	.7	100.1
T014	.94028	14	.45697	.6	100.7
T015	.94477	15	.37920	.5	101.3
T016	.94471	16	.33205	.5	101.7
T017	.94408	17	.30013	.4	102.1
T018	.94655	18	.25201	.4	102.5
T019	.96804	19	.22079	.3	102.8
T020	.96771	20	.19988	.3	103.1
T021	.94471	21	.18427	.3	103.3
T022	.92508	22	.14562	.2	103.5
T023	.92697	23	.13320	.2	103.7
T024	.96771	24	.10863	.2	103.9
T025	.95380	25	.10083	.1	104.0
T026	.95380	26	.09562	.1	104.1
T027	.91765	27	.08488	.1	104.3
T028	.96016	28	.07311	.1	104.4
T029	.88657	29	.07018	.1	104.5
T030	.94655	30	.06373	.1	104.6
T031	.95163	31	.06011	.1	104.6
T032	.96016	32	.05514	.1	104.7
T033	.90888	33	.04794	.1	104.8
T034	.92090	34	.03703	.1	104.8
T035	.94146	35	.03214	.0	104.9
T036	.93748	36	.03004	.0	104.9
T037	.95274	37	.02757	.0	105.0
T038	.93946	38	.02270	.0	105.0
T039	.97331	39	.02030	.0	105.0
T040	.90291	40	.01665	.0	105.0
T041	.93419	41	.01223	.0	105.1
T042	.97331	42	.01122	.0	105.1
T043	.94607	43	.00927	.0	105.1
T044	.86857	44	.00759	.0	105.1
T045	.97134	45	.00412	.0	105.1
T046	.95452	46	.00016	.0	105.1
T047	.89271	47	-.00047	-.0	105.1
T048	.92293	48	-.00334	-.0	105.1
T049	.93227	49	-.00855	-.0	105.1
T050	.97134	50	-.00976	-.0	105.1
T051	.89149	51	-.01333	-.0	105.1
T052	.95452	52	-.01407	-.0	105.0
T053	.93678	53	-.01593	-.0	105.0
T054	.90394	54	-.01962	-.0	105.0
T055	.93849	55	-.02687	-.0	104.9
T056	.93849	56	-.03559	-.0	104.9
T057	.86436	57	-.03956	-.1	104.8
T058	.89678	58	-.04620	-.1	104.8
T059	.91432	59	-.05080	-.1	104.7
T060	.84629	60	-.07506	-.1	104.6
T061	.94189	61	-.07832	-.1	104.5
T062	.90394	62	-.08927	-.1	104.4
T063	.91763	63	-.10926	-.2	104.2
T064	.92528	64	-.12234	-.2	104.0
T065	.94348	65	-.16248	-.2	103.8
T066	.88943	66	-.20493	-.3	103.5
T067	.91051	67	-.28138	-.4	103.1
T068	.94348	68	-.30362	-.4	102.7
T069	.92782	69	-.34648	-.5	102.2
T070	.88241	70	-.45685	-.6	101.6
T071	.86392	71	-.52091	-.7	100.9
T072	.94189	72	-.63748	-.9	100.0

Table A.3.TS. Communalities and Eigenvalues for Seeded Bands: Target Area.

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
T001	.93233	1	53.05430	73.7	73.7
T002	.95521	2	4.89410	6.8	80.5
T003	.96113	3	4.15029	5.8	86.2
T004	.86924	4	2.22267	3.1	89.3
T005	.90693	5	1.33385	1.9	91.2
T006	.97188	6	.90319	1.3	92.4
T007	.72588	7	.86051	1.2	93.6
T008	.92377	8	.79258	1.1	94.7
T009	.96510	9	.74292	1.0	95.8
T010	.96113	10	.58931	.8	96.6
T011	.96866	11	.51457	.7	97.3
T012	.96174	12	.44061	.6	97.9
T013	.95583	13	.36978	.5	98.4
T014	.94592	14	.32229	.4	98.9
T015	.93763	15	.28169	.4	99.3
T016	.94432	16	.25842	.4	99.6
T017	.94005	17	.23903	.3	100.0
T018	.95105	18	.21613	.3	100.3
T019	.95521	19	.19651	.3	100.5
T020	.97416	20	.17857	.2	100.8
T021	.94016	21	.15246	.2	101.0
T022	.94047	22	.13542	.2	101.2
T023	.96866	23	.13061	.2	101.4
T024	.96352	24	.11363	.2	101.5
T025	.97416	25	.10813	.2	101.7
T026	.90110	26	.08765	.1	101.8
T027	.93008	27	.07853	.1	101.9
T028	.95264	28	.07502	.1	102.0
T029	.93763	29	.06940	.1	102.1
T030	.93385	30	.06055	.1	102.2
T031	.95583	31	.05498	.1	102.3
T032	.95264	32	.05367	.1	102.3
T033	.95372	33	.04071	.1	102.4
T034	.89898	34	.03897	.1	102.4
T035	.97386	35	.03052	.0	102.5
T036	.92124	36	.02843	.0	102.5
T037	.97756	37	.02694	.0	102.6
T038	.94843	38	.02307	.0	102.6
T039	.94674	39	.02124	.0	102.6
T040	.84127	40	.02071	.0	102.7
T041	.92372	41	.01382	.0	102.7
T042	.94674	42	.01222	.0	102.7
T043	.92124	43	.00930	.0	102.7
T044	.96073	44	.00711	.0	102.7
T045	.96175	45	.00530	.0	102.7
T046	.92142	46	.00396	.0	102.7
T047	.82323	47	.00275	.0	102.7
T048	.95742	48	.00164	.0	102.7
T049	.94843	49	-.00185	-.0	102.7
T050	.97386	50	-.00347	-.0	102.7
T051	.89579	51	-.00449	-.0	102.7
T052	.92102	52	-.00567	-.0	102.7
T053	.96082	53	-.00763	-.0	102.7
T054	.89813	54	-.00990	-.0	102.7
T055	.96082	55	-.01402	-.0	102.7
T056	.94018	56	-.01817	-.0	102.6
T057	.91603	57	-.02002	-.0	102.6
T058	.85142	58	-.02353	-.0	102.6
T059	.94917	59	-.02613	-.0	102.5
T060	.93016	60	-.03130	-.0	102.5
T061	.97108	61	-.03759	-.1	102.5
T062	.93302	62	-.04120	-.1	102.4
T063	.94888	63	-.05243	-.1	102.3
T064	.93870	64	-.06137	-.1	102.2
T065	.94497	65	-.08479	-.1	102.1
T066	.92078	66	-.10293	-.1	102.0
T067	.92811	67	-.11227	-.2	101.8
T068	.94888	68	-.13549	-.2	101.6
T069	.88283	69	-.15711	-.2	101.4
T070	.89813	70	-.20420	-.3	101.1
T071	.91545	71	-.31352	-.4	100.7
T072	.97108	72	-.49846	-.7	100.0

TABLE A.3.C. Communalities and Eigenvalues for All Bands, Non-seeded Bands, and Seeded Bands: Control Area.

ALL BANDS

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
C01	.98636	1	14.45275	76.1	76.1
C02	.99585	2	1.26990	6.7	82.8
C03	.99337	3	.88598	4.7	87.4
C04	.97892	4	.58713	3.1	90.5
C05	.99533	5	.36899	1.9	92.4
C06	.99831	6	.34014	1.8	94.2
C07	.99640	7	.23757	1.3	95.5
C08	.99828	8	.19271	1.0	96.5
C09	.98835	9	.13059	.7	97.2
C10	.99477	10	.10774	.6	97.8
C11	.99264	11	.09439	.5	98.3
C12	.99572	12	.08635	.5	98.7
C13	.96346	13	.07755	.4	99.1
C14	.98381	14	.06270	.3	99.4
C15	.94119	15	.03569	.2	99.6
C16	.99702	16	.02950	.2	99.8
C17	.97763	17	.02347	.1	99.9
C18	.96544	18	.01661	.1	100.0
C19	.97137	19	.00032	.0	100.0

NOT SEEDED BANDS

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
C01	.79209	1	14.40639	75.8	75.8
C02	.93852	2	1.40408	7.4	83.2
C03	.89916	3	.92517	4.9	88.1
C04	.89670	4	.62445	3.3	91.4
C05	.98033	5	.38487	2.0	93.4
C06	.97830	6	.28338	1.5	94.9
C07	.90648	7	.20296	1.1	96.0
C08	.89256	8	.18581	1.0	96.9
C09	.85654	9	.13339	.7	97.6
C10	.88215	10	.10646	.6	98.2
C11	.84322	11	.09904	.5	98.7
C12	.98033	12	.08615	.5	99.2
C13	.87393	13	.07480	.4	99.6
C14	.87271	14	.04712	.2	99.8
C15	.78843	15	.03587	.2	100.0
C16	.97830	16	.01904	.1	100.1
C17	.93852	17	.01284	.1	100.2
C18	.88188	18	-.00505	-.0	100.1
C19	.89670	19	-.02677	-.1	100.0

SEEDED BANDS

VARIABLE	EST COMMUNALITY	Component	EIGENVALUE	PCT OF VAR	CUM PCT
C01	.84822	1	14.71206	77.4	77.4
C02	.91673	2	1.41625	7.5	84.9
C03	.89335	3	.81319	4.3	89.2
C04	.95527	4	.52588	2.8	91.9
C05	.97162	5	.36667	1.9	93.9
C06	.98256	6	.34004	1.8	95.7
C07	.91655	7	.21433	1.1	96.8
C08	.93534	8	.20050	1.1	97.8
C09	.90897	9	.12118	.6	98.5
C10	.95178	10	.10890	.6	99.0
C11	.88686	11	.06228	.3	99.4
C12	.97162	12	.05127	.3	99.6
C13	.87495	13	.04401	.2	99.9
C14	.83662	14	.02819	.1	100.0
C15	.86065	15	.02085	.1	100.1
C16	.98256	16	.00983	.1	100.2
C17	.91673	17	.00109	.0	100.2
C18	.86953	18	-.00576	-.0	100.2
C19	.95527	19	-.03072	-.2	100.0

TABLE A.4.TA. Station-Component Correlationa All Bands: Target Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
T001	.85250	.29931	.25495	.06240	-.07812	-.15981	.01304	-.03441	.05701	-.09386
T002	.89896	-.22420	-.21902	.12054	.06701	-.03021	-.03155	.03330	.15712	-.03602
T003	.87594	.03036	-.36092	-.03315	.06625	-.09778	-.05511	.06819	.07211	.04181
T004	.70764	.42020	-.11708	-.20370	-.00995	.25210	.28996	-.05583	-.03313	-.04617
T005	.78883	.12569	-.06484	.44633	.07909	-.19435	-.06531	-.04022	-.18478	-.11470
T006	.64632	.35320	.15199	.02246	.24313	.24401	.03696	.31997	-.03351	-.05553
T007	.51379	.33514	.03067	.27597	.40480	.22269	.12757	.01551	.06393	.00803
T008	.71841	-.41037	-.24013	-.22868	-.16419	.20121	-.18827	.10044	-.08417	.08731
T009	.91555	-.22504	-.07308	-.04602	-.01002	.01302	-.14834	.07928	-.03841	-.01407
T010	.82385	-.07036	-.36960	.06148	.10348	-.12381	-.03452	-.03308	.04991	.03893
T011	.86407	.31050	-.22866	-.14915	-.07668	-.02949	-.02927	-.02313	-.04854	.05810
T012	.84009	.37584	-.24795	-.11742	-.06929	.02670	-.00187	-.09654	.04414	.11183
T013	.84152	.25538	-.25985	.10728	-.03606	.15338	-.13906	-.04112	.10775	.14963
T014	.89595	.27036	-.12331	-.15799	-.17035	.12534	.06190	-.03086	.00158	.00477
T015	.83833	.11990	-.36564	-.21388	.12364	-.02786	.02772	.05761	-.03304	-.02353
T016	.91326	-.24240	-.23021	-.12427	.02432	.01184	-.05275	.01950	-.03676	-.06366
T017	.85452	-.32320	-.26479	-.10928	.04158	.05629	-.08786	-.02081	-.03716	.03874
T018	.87920	.26973	-.31235	.00247	-.09041	-.03694	.05992	-.00833	-.04892	.04396
T019	.84560	-.27093	-.33044	.03837	.08064	-.08164	-.04633	.02050	.18379	-.03584
T020	.96063	-.12929	-.13511	.03513	.02626	.00425	.14675	-.00179	-.17444	-.03352
T021	.90396	.00050	-.27160	-.08421	.13221	-.07320	-.06908	.03068	-.06628	.00709
T022	.88733	-.09381	-.29691	-.12309	-.06269	-.05187	.11289	.01039	.03640	-.04540
T023	.90377	.23384	-.20515	-.04166	.04918	-.07381	-.02723	-.01489	-.06278	.03542
T024	.94280	-.13265	-.11119	.08662	-.04550	.08129	.05298	-.10144	-.02751	-.09324
T025	.93573	-.27218	-.00340	.03823	-.05624	-.01345	.00212	-.02397	-.00346	-.02848
T026	.77337	-.45723	-.01340	.13603	-.04106	.05057	.11613	.01994	-.03746	-.22412
T027	.83061	.14297	-.36677	-.04266	.12636	-.01423	.00403	-.09503	.07346	.07398
T028	.90033	.11307	-.30091	.08350	.10622	-.12699	.01479	-.06305	-.07769	-.02387
T029	.81971	-.18436	-.22530	-.15046	.12590	.01360	-.07961	.04309	-.12931	-.10567
T030	.83191	.27407	-.28726	-.15970	-.13897	-.01797	.08490	.00744	-.09631	.00335
T031	.81497	.34695	-.40767	.00469	-.02076	-.00172	-.02251	-.06135	.01178	.08586
T032	.84666	.01511	-.37140	.12748	.18034	-.18070	.00976	-.00132	-.06236	-.08830
T033	.88904	-.07368	-.31211	-.07163	.06244	-.09124	-.07218	-.01224	.12831	.07341
T034	.85622	.06280	-.13821	-.26957	-.16770	-.02271	.06473	.07688	.04044	.03795
T035	.85035	-.18039	.33436	-.10539	.21124	.08488	-.11501	-.04457	-.07586	.06505
T036	.75107	-.13944	.36100	-.26693	.14060	-.26995	.17468	.03664	.11647	.09434
T037	.90164	-.02521	.28662	-.14683	.16783	-.01191	-.05962	.04281	-.07841	.03455
T038	.90926	.19771	.21976	.06920	.01933	-.07799	-.04189	.02842	-.02796	-.10820
T039	.80063	.22980	.38535	-.12926	-.03671	-.09042	-.09885	-.20418	.09968	-.05960
T040	.84601	.17165	.20055	.08710	.08993	.07862	.06408	.05298	.15334	-.04423
T041	.87607	.14588	.33240	-.10913	-.02999	-.09820	-.00688	-.03490	-.01653	-.08065
T042	.80203	.22202	.35319	-.19876	-.04721	-.15272	.04269	-.21742	.08092	-.08919
T043	.81470	-.16138	.30814	-.24222	.18040	-.14407	.04369	.02088	.02135	.11423
T044	.83275	-.15500	.23157	-.16369	.02616	.24005	.01844	-.14718	-.04297	-.03285
T045	.87608	-.05543	.33802	-.19743	.06696	.04861	-.05824	-.00945	-.10622	-.03926
T046	.85773	-.00857	.36180	.00794	.23659	-.00568	-.05710	-.00565	.09422	.05402

TABLE A.4.TA. Station-Component Correlations All Bands: Target Area. (Continued)

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
T047	.74801	.33011	.01900	.02750	.24795	.21378	.15146	.13273	.12429	-.05936
T048	.89467	.02471	.24318	-.14611	.13190	.02179	-.19426	-.02356	-.10178	-.07258
T049	.89506	.30516	.17383	-.09166	-.09476	.01908	-.01233	-.02742	-.09078	-.13192
T050	.89554	-.13062	.26955	-.18300	.15897	.03888	.03524	-.02978	-.08888	.07050
T051	.74168	.37584	.11108	.40463	.07195	.03841	-.20290	.06792	.03797	.01061
T052	.84079	-.01304	.35359	-.26725	.05820	-.10046	-.04129	-.02546	.09143	-.03347
T053	.90190	-.09202	.13487	.18761	-.08131	.12620	.05669	-.14369	-.01616	.08995
T054	.74385	.36284	.18772	.40969	-.07158	.02463	-.18034	-.07668	-.06626	.01566
T055	.90357	-.06756	.21348	.18422	-.10588	.14927	-.03799	-.11989	-.01489	.06475
T056	.87311	-.19162	.23676	-.08392	-.18244	.15064	-.15939	-.09158	.02590	.04242
T057	.80716	-.32976	.16967	.10564	-.02492	-.06899	.17919	.13674	-.12888	.21649
T058	.66818	-.46877	.21019	.27509	-.01049	-.15354	.24505	-.01767	-.03040	.13336
T059	.89931	-.27798	-.10236	.08464	-.14085	-.03979	-.07242	-.00704	.06905	-.08180
T060	.86839	.18704	.05062	-.02145	-.25257	.03741	-.09207	.22961	.04571	.01074
T061	.91756	.13620	-.04791	.03220	-.22645	-.01641	.15263	.01522	.00596	-.10730
T062	.87564	.16050	.17323	.25390	-.07672	-.09255	.04991	-.04582	-.08262	.03560
T063	.81389	-.44859	-.05666	.22867	-.00504	-.05751	.03572	.09325	.03967	-.09394
T064	.87531	-.32128	-.01594	.13538	-.07405	.06938	-.03209	.04942	.15114	-.12993
T065	.85585	-.37691	-.12043	.13719	.05276	.16496	.14668	-.24980	.01338	.03041
T066	.75094	-.50236	.07190	.11896	-.10377	.11327	-.03866	-.03829	.01286	.06416
T067	.84946	.28417	.19037	.13235	-.16629	-.02979	-.01466	.05771	.18276	.06109
T068	.84098	-.44656	.05005	.07546	-.10637	.03818	.04891	.06232	.06268	.01296
T069	.80913	.13602	.29405	-.11443	-.31959	-.08369	.01377	.27513	-.02867	-.02771
T070	.76156	.35677	.15934	.24429	-.04741	-.11399	.00996	.07163	-.13733	.19605
T071	.84386	-.31249	.24132	.07914	.06283	.02264	-.02403	.14367	.01860	.05535
T072	.92021	.08760	.10518	.09450	-.25859	.06507	.12212	.02339	.01429	.01975

Table A.4.TN. Station-Component Correlations for Non-Seeded Bands: Target Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
1001	.83424	-.27191	-.25237	.18434	-.12415	-.11500	-.08596	-.16986	.04841	-.04992
1002	.85712	.28893	.23761	.02377	-.08878	-.10997	-.14083	.00971	.03046	.10461
1003	.89426	-.14378	.23654	-.02609	-.06211	-.21156	-.01721	.05777	-.02143	.04832
1004	.73447	-.51934	.05776	-.26343	.22579	.13340	.11878	.05237	-.02611	.16917
1005	.69785	.06912	.32711	.28700	-.39174	.33582	-.04871	-.06290	.06424	.10446
1006	.72026	-.35714	.03115	-.27899	-.03433	-.29161	.18491	-.15945	.21695	.25349
1007	.61660	-.32118	.18589	-.30596	.11849	.43471	.31751	-.02320	.13422	-.00814
1008	.64969	.56532	.16434	-.05238	.52052	-.03392	.00957	-.11435	-.30176	.04123
1009	.86371	.30445	.18768	-.06879	.08383	-.24376	.03116	-.12169	-.08561	.03266
1010	.68975	-.01499	.39595	.02691	-.22265	-.06472	-.06692	.32055	.25937	-.20763
1011	.78017	-.48016	.06197	.08332	.01352	-.03340	-.09357	-.08164	.11290	-.00877
1012	.77634	-.56542	.01342	.11026	.15565	.02839	-.08100	.01187	-.08414	-.03057
1013	.84666	-.22372	.03692	.00133	.25125	.01937	-.07281	.01641	-.17966	-.08978
1014	.84795	-.41992	.06855	.05814	.30855	.04912	.01529	.12008	.17630	-.00287
1015	.87075	-.31205	.31042	-.05510	.00173	-.04931	-.00665	.00405	-.10778	-.02587
1016	.86072	.21281	.35248	-.11109	-.05709	-.15588	.04315	-.12160	-.03842	.04578
1017	.85630	.33388	.23857	-.16992	.12989	-.03958	-.02508	-.04405	-.11550	.02256
1018	.87480	-.32481	.19389	.14318	.04177	-.03221	.12873	-.04080	-.01387	-.17678
1019	.80038	.32424	.37311	.09558	-.14758	-.06451	-.20083	-.00414	.07868	.11919
1020	.95396	.10585	.24832	-.03872	-.00616	.09487	.27799	-.04515	.00713	.00437
1021	.85992	-.04787	.36819	-.05308	-.19722	-.07575	-.00439	-.04061	-.08179	.07882
1022	.90405	-.15954	.29669	.02012	.10015	-.01532	.03667	.05794	-.00244	-.00906
1023	.84414	-.34901	.19625	-.07086	-.11243	.03168	-.04948	.07636	-.05156	.06690
1024	.92990	.23891	.15200	-.00887	.07168	.14290	-.01146	-.10298	.05580	-.08189
1025	.85981	.46377	.13975	.03674	.06480	.13891	.01500	-.08776	-.04877	.06740
1026	.73180	.55525	.23342	-.08641	.01077	.06725	-.00605	-.11316	-.05056	-.13838
1027	.84671	-.33864	.25228	-.02204	.02436	.08459	-.14379	.22923	-.01212	-.00378
1028	.89032	-.26819	.24822	.01115	-.17946	-.00786	.01791	-.05600	-.04239	-.14971
1029	.71452	.19206	.50980	-.17394	-.07001	.02714	-.07167	-.00875	-.16367	.00822
1030	.83885	-.39165	.21050	-.03635	.08607	-.09696	.16085	-.05280	-.02178	-.09762
1031	.81030	-.51602	.20930	.04132	.07549	.19028	-.11052	-.00489	-.01341	.01348
1032	.87324	-.11242	.38797	-.00362	-.26877	.01038	-.00770	-.07924	-.01504	-.08793
1033	.84608	-.03061	.21100	.01967	-.10813	-.04192	-.25009	.30507	-.15810	.11531
1034	.82767	-.34955	-.01722	.22593	.12321	-.06152	.16425	.05974	.12844	.00023
1035	.78170	.34176	-.35618	-.33968	-.08030	.06634	-.05670	-.05246	-.03540	-.07761
1036	.78476	-.06407	-.31118	-.20042	-.24425	-.07083	.14600	.23001	-.13756	-.01633
1037	.86382	-.01501	-.26339	-.29700	-.19758	-.06950	-.02246	-.03425	-.06637	-.07620
1038	.90089	-.23019	-.16317	.09759	-.11849	-.05472	.03228	-.20031	.01869	-.10020
1039	.86143	-.15154	-.28976	-.09152	.10389	.12516	-.27467	.04763	-.10135	-.05025
1040	.86365	-.15727	-.26349	-.01484	.00703	.07739	-.04293	-.10577	-.01845	-.01726
1041	.91195	-.11100	-.25563	-.06643	-.05937	-.04537	-.13039	-.07531	-.00666	-.02435
1042	.85312	-.24361	-.31703	-.11952	.00517	.19133	-.22423	-.00925	-.08648	.01596
1043	.83878	-.01545	-.33057	-.25342	-.17474	-.01661	.06461	.06982	-.09248	.07455
1044	.77569	.15714	-.20369	-.26794	.19310	.11948	-.14093	.06387	.19826	.11773
1045	.85846	.07825	-.32939	-.28514	-.03500	.02077	-.01221	-.04130	.01332	-.10743
1046	.87058	.12987	-.31097	-.23655	-.08995	.00162	.01255	.07777	-.04014	.02828

Table A.4.TN. Station-Component Correlations for Non-Seeded Bands: Target Area.(Continued).

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
T047	.72090	-.41261	.11504	-.23022	.18025	-.05689	.10821	-.18949	.08869	.16872
T048	.87023	.00278	-.18032	-.26304	-.16340	-.21591	-.06146	-.06906	.18571	-.11145
T049	.89251	-.35431	-.13069	-.01703	.11012	-.02301	.01729	-.03971	-.00129	-.10323
T050	.88302	.09046	-.23300	-.33834	-.04249	.09589	.04668	.03858	-.05199	-.06410
T051	.80142	-.16805	-.20535	.27732	-.18073	.07410	-.16672	-.16951	.09590	.15700
T052	.85279	.01731	-.36045	-.27325	-.08501	.00193	-.08630	.04301	-.07551	.03648
T053	.84914	.22495	-.19945	.11139	.13652	.19023	.12388	.10449	.08097	-.03843
T054	.87747	-.02409	-.19473	.28838	-.03743	.17617	-.20128	-.06443	.03992	.10605
T055	.85276	.29092	-.28490	.14824	.15778	.08739	.04452	.01960	.13055	.01485
T056	.80483	.32529	-.33632	-.03816	.22686	-.04464	-.10519	.04989	.16688	.05290
T057	.77813	.35115	-.19123	.12780	-.19005	-.04656	.32350	.10235	-.05610	-.00277
T058	.60190	.55851	-.13138	.25852	-.23068	.21130	.27832	.07376	-.10331	.09205
T059	.84443	.34307	.17330	.15054	.07761	-.11104	-.08704	.11781	.15968	-.12121
T060	.80615	-.02444	-.00169	.25524	.26230	-.39529	.04319	.17897	-.02799	.19990
T061	.92218	-.23624	-.00844	.17066	.10132	.03925	.06523	.02619	-.04178	-.10360
T062	.79938	-.06416	-.29837	.37787	-.23609	.22637	.01464	-.06792	-.05331	.15514
T063	.73141	.56683	.23947	.13437	-.08485	.01371	.00923	-.10494	.03767	-.06705
T064	.80104	.49461	.12628	.05281	.11627	-.08518	-.08276	-.02831	.08898	.00284
T065	.86672	.39075	.07138	.03702	.14006	.27458	.03228	.08064	.14237	-.04392
T066	.64838	.69371	-.09986	.00649	.08828	-.03758	-.06362	-.10573	.12428	-.08599
T067	.68607	-.14851	-.33422	.64614	.20119	-.15034	-.01978	-.05987	-.15229	-.12043
T068	.74168	.60643	.02605	.12834	.09733	.11427	.04766	.04633	-.00690	.09080
T069	.87083	-.03468	-.33508	.20640	-.08811	-.37700	.05670	-.04210	.02061	-.00739
T070	.82086	-.22846	-.18869	.22238	-.21472	-.01157	.24302	.05613	-.09162	.02968
T071	.71756	.48001	-.18814	-.07282	-.03578	-.27505	.09427	.16411	.07043	.00397
T072	.92202	-.07215	-.19508	.22476	.16374	.06450	.09765	.08994	-.04419	-.01024

Table A.4.TS. Station-Component Correlations for Seeded Bands: Target Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
T001	.86603	.38795	.05838	-.04330	-.11045	.09116	-.07989	-.14695	-.02063	.12274
T002	.91269	-.28195	.01166	.20010	-.01783	.07268	-.01728	.00387	-.03584	-.03848
T003	.86935	-.33984	.23025	.03592	.08856	.04531	-.13051	.07824	.04101	-.05046
T004	.76586	.02325	.25065	-.32781	-.16432	.24503	.21397	-.01704	-.12230	.01096
T005	.85545	.23688	.25257	.21575	-.08063	-.06527	-.13856	-.06136	.02344	-.05219
T006	.59684	.41935	.15809	.18127	.10359	.02959	.30813	.20789	.14860	-.11005
T007	.44682	.30978	.30378	.47269	.29946	-.02728	.02924	.08774	-.21869	.17231
T008	.70509	-.44673	-.19828	-.16537	.03809	-.42296	.12014	.04310	.19502	-.02735
T009	.93578	-.14489	-.11666	.01578	.03108	-.14689	.03776	-.12418	.02169	-.01359
T010	.89642	-.33269	.15829	.11571	.05711	.00484	-.03635	-.05176	.13830	-.04138
T011	.90609	-.10709	.29504	-.21464	.07750	-.04488	.04120	-.01710	.04589	.06344
T012	.86827	-.09564	.36941	-.17899	.06229	.08347	.09375	-.06941	.01181	-.00505
T013	.83426	-.08011	.49203	.05781	-.01696	-.03012	.06124	.12947	.02654	.00659
T014	.91097	.01058	.20106	-.26216	-.05666	-.01010	.06869	.03865	-.00981	.09286
T015	.82745	-.30012	.19086	-.19912	.26659	.03081	-.09206	.26009	-.20844	.01265
T016	.92649	-.30784	-.07820	-.08749	.04359	-.04233	.00794	-.05314	-.09200	-.01823
T017	.84954	-.42822	-.08314	-.02778	.09106	-.14073	-.05997	-.03360	.06300	.06488
T018	.88080	-.15574	.39205	-.12794	-.02284	.05781	-.01848	.01947	.03347	.05470
T019	.86007	-.41007	-.00026	.10134	.06373	.14561	-.03453	.03773	.00854	-.09003
T020	.97962	-.14767	-.05773	.02676	-.03051	.00774	-.05780	-.02278	-.06505	-.07100
T021	.92175	-.20066	.11707	-.07734	.18148	-.01288	.01047	-.02540	-.06701	.12415
T022	.88353	-.36399	-.04735	-.07223	-.12049	.10804	.01720	-.06253	.03844	.01221
T023	.93145	-.05761	.26313	-.05503	.04448	-.08751	-.00651	-.07125	.00347	.10362
T024	.95779	-.12381	.03856	.01459	-.10827	.11280	.03265	-.00750	.02997	-.10951
T025	.97413	-.08211	-.12419	-.04604 [illegible]	[illegible]	[illegible]	-.01896	.01390	-.00463	-.03802
T026	.82276	-.14183	-.28858	.16155	-.29548	.09296	.01088	.15138	.00297	-.13023
T027	.81990	-.31435	.24715	.07450	.17328	.02666	-.10851	.07735	.08878	-.12969
T028	.90886	-.22119	.22509	.13570	.00904	.02562	-.12040	-.15114	-.01254	-.01207
T029	.87394	-.19286	-.05553	-.12710	.14567	-.07659	.17470	-.08245	-.13099	.19155
T030	.82807	-.14430	.31464	-.30351	-.10584	.09882	.06228	-.02703	.06534	.01119
T031	.80872	-.22934	.48632	-.03471	.01457	-.03573	-.08974	.08430	.12835	.12580
T032	.83182	-.30967	.21728	.17550	.06962	.00190	-.29499	.00234	-.05451	.02487
T033	.89795	-.33775	.09291	-.00302	.11234	.10262	.01496	.03157	.08628	-.11914
T034	.87542	-.18181	-.02566	-.30670	-.00592	.08723	.19141	-.01733	-.00459	.00318
T035	.87434	.16861	-.27838	.02796	.27289	-.05192	.09975	-.03218	.00785	-.01012
T036	.73581	.15828	-.52333	-.07655	.07079	.18248	-.18734	.10534	.11720	.20618
T037	.91978	.19502	-.23986	-.01857	.15655	-.07534	.06138	-.00980	.02285	-.03985
T038	.91403	.32004	.01039	.04057	-.00751	-.02276	-.04724	-.10185	-.09913	-.03592
T039	.76630	.48951	-.07622	-.19311	.05101	.03152	-.21064	-.09306	.10305	-.00285
T040	.83344	.25586	.03218	.16100	.00934	.04642	.04429	.17858	-.04883	.05673
T041	.85848	.37835	-.12747	-.15580	.00064	.05442	-.09062	-.02494	.07196	.07752
T042	.77337	.40966	-.10425	-.28963	-.01415	.18630	-.16130	-.13511	.07379	.07462
T043	.80339	.09224	-.45343	-.02250	.19630	.00790	-.07202	-.02051	.09552	.12392
T044	.91365	.09801	-.30736	-.09045	.04334	-.03965	.08642	.02657	-.03249	-.06609
T045	.88065	.22031	-.27693	-.13846	.11393	-.06242	.09006	-.03686	-.02433	-.11954
T046	.84816	.33047	-.16705	.15035	.22919	.05573	-.03198	.00148	-.06618	.01162

Table A.4.TS. Station-Component Correlations for Seeded Bands: Target Area. (Continued).

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
T047	.76253	.25200	.16893	.21517	.10183	.24001	.21671	.10232	.09600	.04698
T048	.89591	.23459	-.12016	-.09759	.22487	-.07885	.00502	-.09673	-.09367	-.10904
T049	.89698	.32089	.06946	-.16864	-.04037	-.06479	-.00486	-.09739	-.12258	-.08091
T050	.89841	.12311	-.32017	-.04795	.19312	-.03534	.03897	.01917	.01459	-.04797
T051	.72227	.36909	.41011	.28728	-.00707	-.12909	.02364	.01511	-.01653	.02496
T052	.83696	.22979	-.28276	-.25421	.12174	.13624	-.10151	.09737	.04653	-.17052
T053	.95274	.07322	-.01336	.15640	-.07653	-.04895	.03373	-.13884	-.05108	.01285
T054	.68131	.45807	.39906	.21094	-.09057	-.12908	-.02957	-.10767	.13188	-.06836
T055	.94455	.17238	.00770	.11540	-.01812	-.06148	.02353	-.10962	-.13506	-.06640
T056	.93694	.03530	-.19428	-.17844	-.02468	-.09828	-.06120	.05145	-.04306	-.14952
T057	.83032	-.07315	-.32698	.10976	-.09898	-.07621	.11743	.01468	.08517	.00148
T058	.73703	-.07002	-.42395	.30740	-.13644	.14688	-.08026	.06942	.11040	.05258
T059	.93228	-.20682	-.11066	.04344	-.14780	-.08282	-.12561	-.06796	-.11861	-.06605
T060	.88788	.21422	.13905	-.17377	-.12370	-.17424	-.01943	.06902	.06493	.02210
T061	.91653	.00257	.07367	-.05825	-.31918	-.02007	-.01934	-.03396	-.10955	.07832
T062	.91055	.23315	.09115	.13259	-.13634	.10321	.13985	-.12735	.04745	-.06033
T063	.85298	-.20049	-.25788	.26439	-.13736	-.02285	-.07662	.13655	-.09515	.00282
T064	.90468	-.11621	-.15038	.16696	-.14693	-.00095	-.01378	.07278	-.15333	-.00358
T065	.86392	-.34778	-.16490	.22435	.02657	.13683	.10299	-.24470	-.03089	-.01379
T066	.84777	-.22457	-.26400	.13710	-.12383	.02633	.10339	.01195	.24374	.10002
T067	.89745	.33502	.14974	.01189	.00203	.09901	-.02928	.14564	-.06443	-.07303
T068	.86657	-.17190	-.34225	.11384	-.13183	-.07385	.05779	.06202	-.08567	.03736
T069	.76815	.32891	-.07851	-.31045	-.24245	-.16939	-.07439	.34293	-.06385	.05303
T070	.73807	.39243	.31548	.12021	-.05318	-.13994	-.08943	.00717	.23949	-.04443
T071	.89802	.08085	-.29323	.22304	-.02675	-.03895	.08129	-.03433	.00001	.02278
T072	.92056	.11674	.02078	-.00748	-.30795	-.06992	.04872	.01252	-.10184	.03049

TABLE A.4.CA. Station-Component Correlations for All Bands: Control Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
C01	.82648	-.27812	-.06707	.07496	.34961	.28779	.05301	-.01747	.09277	-.00341
C02	.89596	-.28302	.08060	.22436	-.08044	.03745	-.09365	-.04949	-.08560	.08814
C03	.84563	-.19513	.16236	.29929	-.13599	-.06164	.16255	.02749	.01889	-.10256
C04	.89854	.29134	.15950	.05397	.13146	-.04205	-.13246	.02474	-.03886	.04910
C05	.92392	-.06284	.04036	-.24077	-.12826	.10456	-.08380	-.04954	.08410	-.01127
C06	.89110	.03586	-.40019	.03970	.07501	-.12074	-.01768	-.02773	.05213	.04276
C07	.88794	-.07395	-.29939	-.00227	-.07449	-.11001	.01825	.16365	.05616	-.07138
C08	.89665	-.15910	-.28429	-.08799	-.12231	.19814	-.01880	.10384	-.12375	.04713
C09	.90113	-.27461	.13470	-.07330	-.00762	-.06099	.03714	.02863	-.02887	-.02229
C10	.93331	.00437	.00039	-.19680	-.07088	-.00722	-.03056	.02224	-.08477	-.00688
C11	.82355	-.16813	.30392	-.29808	.17634	-.13266	.12487	.11841	-.01248	.02834
C12	.92567	-.05527	.08905	-.26551	-.17087	.07564	-.05769	-.11399	.09603	-.02765
C13	.87437	.02289	.17314	-.03384	.04010	-.23240	-.01718	-.12668	.00758	.03859
C14	.80915	.45190	-.05773	.01429	-.11238	.08737	.32409	-.07404	-.00737	.08484
C15	.72848	.43819	.28050	.20707	-.12244	.07895	-.11184	.14417	.10420	.03454
C16	.90647	.03054	-.34078	.09008	.07060	-.15459	-.03593	.00246	.05047	.06204
C17	.83163	-.36881	.10899	.25512	-.03263	-.00305	-.02181	-.08128	-.02101	-.02135
C18	.84816	.39255	-.21930	-.00251	.06582	-.00013	-.04795	-.08523	-.07662	-.14756
C19	.87480	.33342	.20947	.02282	.16617	.07836	-.01367	.01121	-.06570	-.05931

Table A.4.CN. Station-Component Correlations for Nonseeded Bands: Control Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
C01	.78945	-.28211	-.11362	-.10475	.23701	.19418	-.00516	.05569	.03822	.01993
C02	.90901	-.15590	-.04998	-.22873	-.20421	.08646	-.04096	-.03881	.01426	.05540
C03	.87834	.06691	.12452	-.33409	-.11743	.04202	.06208	-.02328	.06465	-.06459
C04	.94493	.17117	.10017	.02495	.07502	.04179	.04458	-.08973	.06024	.02428
C05	.87820	-.02872	-.36176	.26463	-.03534	.01027	-.09458	-.01092	.08990	-.06979
C06	.88146	-.32002	.27952	.03912	.14450	-.03057	-.08082	.03226	-.01829	-.06677
C07	.89813	-.28939	.07566	.08153	-.05775	-.17074	.13793	.08210	.05190	-.00291
C08	.80641	-.50755	-.10775	.17933	-.07516	.03004	.07312	-.07388	-.03417	.07966
C09	.91105	.00920	-.22074	-.13538	.05077	-.06240	.15384	-.03337	-.02051	-.03275
C10	.94616	.02429	-.08308	.08520	-.11724	-.14111	-.01521	.01973	-.05941	.03439
C11	.80434	.29086	-.28338	-.13096	.21281	-.10147	.03168	.05312	.03353	.02634
C12	.88152	.04353	-.38569	.21801	-.06912	.11112	-.03121	.01470	-.04738	-.04185
C13	.87711	.27860	-.04234	-.10084	.01167	-.16138	-.13677	-.10961	-.01003	-.00967
C14	.81544	.27096	.36071	.16557	-.05500	.10166	.05307	-.06246	.03830	-.02733
C15	.70340	.46059	.14066	.14563	-.13248	.03648	-.01731	.14302	.04947	.05824
C16	.88428	-.30444	.28230	.01874	.08316	-.06770	-.12548	-.00243	.04502	.06089
C17	.90459	-.08130	-.00870	-.31552	-.11875	.04335	-.06862	.08303	-.08134	-.02510
C18	.88546	.01880	.28353	.15914	.04762	.01216	.04432	.01334	-.10538	-.06233
C19	.86215	.39031	.02154	.01201	.13918	.06477	.01800	-.02192	-.09172	.06203

Table A.4.CS. Station-Component Correlations for Seeded Bands: Control Area.

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9	Comp. 10
C01	.84817	-.24522	.01936	.03275	-.13083	.30065	.02707	.04358	-.01189	-.02772
C02	.90194	-.31206	.17214	.11944	-.02235	.00321	-.08285	-.07790	.03923	-.03930
C03	.82918	-.31814	.15895	.20699	.15271	-.10382	.10310	.00699	-.07769	-.06723
C04	.88798	.26400	.29957	-.10434	-.20007	-.06074	-.01037	-.04804	.01566	.03127
C05	.95670	-.04340	-.05095	-.12161	.13914	-.01778	-.13500	-.02832	-.08148	-.03820
C06	.89587	.19123	-.33643	.15695	-.10027	-.02598	-.05595	-.05318	.05994	-.03758
C07	.88209	.03112	-.28723	.17176	-.00419	-.07003	.16869	-.05513	-.08195	.08263
C08	.95498	-.05573	-.17819	.01897	.16793	.13832	.04686	.00283	.07623	.06943
C09	.89984	-.34445	-.04596	-.10070	-.01651	-.05731	-.01688	-.03519	.03123	-.06488
C10	.93056	.02698	-.12110	-.23699	.09580	.03659	-.10909	-.04952	-.02231	.04894
C11	.84617	-.22763	-.06109	-.37065	-.06471	.02576	.15722	-.06583	.02363	.00240
C12	.95900	-.02428	-.05826	-.14841	.12586	-.14574	-.06924	.07583	-.01240	.02140
C13	.88205	-.00266	.06054	-.08226	-.18087	-.22171	.04063	.18025	.01991	.00851
C14	.79409	.40086	.00672	.01831	.22465	.04156	.08914	.11674	.08114	-.06678
C15	.75057	.28021	.44097	.11424	.11377	-.06706	.01494	-.13258	.04359	.04521
C16	.92140	.14965	-.24035	.16718	-.15903	-.05771	-.01536	-.06382	.01031	-.04258
C17	.79416	-.48936	.14560	.20807	-.03083	.04583	-.08060	.10235	.02369	.08867
C18	.82877	.40362	-.07403	.08324	-.03629	.08069	-.09205	.07041	-.05525	.01575
C19	.88944	.28755	.27350	-.06436	-.06879	.16906	.05384	.02085	-.07064	-.02745

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T001	T002	T003	T004	T005	T006	T007	T008	T009	T010
T001	1.00000	.66985	.67315	.63185	.70934	.62722	.49996	.32342	.71515	.59461
T002	.66985	1.00000	.88853	.50059	.72536	.50339	.43837	.73471	.88166	.86667
T003	.67315	.88853	1.00000	.63565	.69192	.53539	.44083	.66433	.82022	.88525
T004	.63185	.50059	.63565	1.00000	.46607	.62622	.58321	.43050	.51181	.51120
T005	.70934	.72536	.69192	.46607	1.00000	.50952	.57652	.39689	.68313	.71924
T006	.62722	.50339	.53539	.62622	.50952	1.00000	.58011	.28483	.52775	.45897
T007	.49996	.43837	.44083	.58321	.57652	.58011	1.00000	.13899	.39031	.39486
T008	.32342	.73471	.66433	.43050	.39689	.28483	.13899	1.00000	.87800	.62148
T009	.71515	.88166	.82022	.51181	.68313	.52775	.39031	.87800	1.00000	.78466
T010	.59461	.86667	.88525	.51120	.71924	.45897	.39486	.62148	.78466	1.00000
T011	.78771	.74929	.85424	.76428	.67092	.59017	.43616	.60492	.74966	.75642
T012	.76246	.71710	.82261	.80242	.63652	.57677	.48595	.54489	.70739	.73115
T013	.70101	.75402	.83765	.67762	.67712	.58598	.57153	.58850	.72916	.75763
T014	.79377	.70640	.81305	.83664	.65154	.61860	.51167	.62667	.75969	.75083
T015	.60985	.78021	.90199	.75359	.62912	.52681	.47316	.59048	.73462	.78497
T016	.66827	.90014	.88070	.56033	.66278	.49345	.35270	.84176	.92320	.82831
T017	.55343	.87075	.83860	.51319	.60330	.40537	.32157	.93080	.91812	.79531
T018	.77458	.76030	.88228	.78782	.73162	.58415	.49858	.58827	.77391	.82436
T019	.57382	.95794	.88942	.45554	.67598	.42321	.35335	.74982	.84672	.87877
T020	.74414	.88542	.90645	.70200	.79523	.60512	.48935	.77061	.91909	.83533
T021	.70383	.86137	.88481	.64964	.73363	.54122	.47522	.70223	.87902	.84983
T022	.67068	.87691	.87906	.67986	.66304	.48517	.32125	.75349	.84487	.84939
T023	.78748	.80723	.87403	.75283	.76702	.60777	.53832	.60020	.80657	.81477
T024	.74168	.91478	.82479	.66453	.79565	.54872	.46113	.76475	.88824	.81449
T025	.73315	.90246	.79912	.53372	.75607	.48102	.39382	.81309	.93560	.76536
T026	.51277	.81261	.64057	.40855	.64450	.38164	.24520	.69595	.79444	.64961
T027	.60657	.80155	.89425	.71373	.70112	.54745	.50586	.61479	.71509	.87447
T028	.75182	.85571	.91663	.67176	.80114	.54518	.51619	.58526	.81970	.86704
T029	.59102	.79186	.77291	.55858	.63231	.45331	.30931	.78181	.83151	.73686
T030	.72563	.71165	.83275	.80899	.63702	.58020	.36181	.56726	.72352	.74563
T031	.67818	.74573	.86793	.77313	.72988	.57066	.48686	.59131	.68318	.81341
T032	.66035	.85621	.90887	.57371	.79295	.48903	.51847	.59899	.77248	.85064
T033	.64326	.92318	.92286	.63361	.70615	.51694	.37309	.73600	.87302	.89906
T034	.71734	.74570	.79050	.70489	.55763	.50539	.32281	.70580	.78978	.76181
T035	.69578	.72294	.62238	.48737	.68095	.58196	.44286	.63125	.80950	.60297
T036	.69482	.61111	.55582	.45665	.45361	.46617	.31285	.45743	.67255	.54938
T037	.80164	.73576	.69917	.60851	.65035	.66787	.47282	.62692	.82459	.65828
T038	.93343	.74226	.72375	.66128	.78027	.66628	.55685	.48527	.79959	.66862
T039	.85600	.56956	.57177	.61143	.60463	.55932	.43094	.43645	.67132	.50711
T040	.86066	.71767	.68512	.65792	.64465	.68753	.60837	.48550	.69109	.60376
T041	.90661	.66889	.65953	.64529	.66960	.65171	.41922	.48867	.76044	.58564
T042	.89042	.58163	.57539	.65429	.58835	.55645	.38878	.40005	.65988	.51962
T043	.72126	.67099	.62180	.46824	.51638	.49990	.39483	.60775	.77761	.56792
T044	.67507	.70916	.61142	.61933	.52889	.54206	.39353	.64401	.75554	.59276
T045	.77106	.70315	.64155	.59849	.61481	.63723	.40573	.63087	.80201	.60427
T046	.79214	.71971	.64282	.54574	.64850	.61164	.59357	.47321	.77568	.59578

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T001	T002	T003	T004	T005	T006	T007	T008	T009	T010
T047	.70861	.62073	.65820	.73269	.57934	.82627	.64434	.35637	.59687	.58897
T048	.80485	.72774	.71804	.55557	.66493	.68350	.47244	.56743	.81907	.67946
T049	.89627	.67178	.70651	.77657	.72035	.66689	.51674	.50403	.75308	.64779
T050	.74285	.75091	.69171	.61034	.61008	.60668	.43782	.67303	.81516	.65516
T051	.77975	.61036	.61404	.56721	.84865	.66569	.65697	.32504	.60136	.59063
T052	.79549	.66095	.66994	.60859	.54201	.54853	.31940	.58448	.72692	.55569
T053	.77068	.80908	.70065	.58856	.71976	.53345	.54418	.61153	.81625	.69559
T054	.82390	.58242	.56893	.52935	.86601	.62231	.52973	.33181	.55917	.55461
T055	.79510	.78597	.68601	.56433	.72070	.55299	.51710	.59389	.81714	.65932
T056	.73535	.75254	.70092	.53161	.54526	.50341	.23402	.71923	.81764	.59762
T057	.64427	.74056	.64368	.40375	.61921	.45782	.32379	.65553	.78061	.63731
T058	.48644	.67186	.48748	.23981	.59715	.27893	.22506	.48271	.62801	.51349
T059	.70777	.90340	.84152	.49770	.69779	.42878	.28241	.78562	.88239	.83405
T060	.80448	.72952	.75694	.69860	.65994	.68546	.39033	.64617	.78861	.64529
T061	.84560	.80146	.78607	.76154	.73451	.57228	.45530	.61953	.78819	.75452
T062	.85786	.75160	.67540	.62181	.89780	.63601	.45907	.38796	.76028	.64134
T063	.56037	.87312	.71673	.32788	.71950	.35587	.37291	.73111	.83302	.73783
T064	.86469	.89842	.75563	.44495	.66629	.45548	.39416	.71378	.88536	.72975
T065	.60592	.89440	.72671	.53545	.63364	.37429	.42204	.74139	.84216	.81387
T066	.51779	.76966	.60718	.29674	.53526	.33164	.17046	.72852	.77528	.62629
T067	.86687	.67082	.67360	.63353	.68857	.59959	.53716	.42234	.70070	.55919
T068	.58789	.85558	.67861	.41442	.62306	.34987	.32892	.78045	.86950	.68443
T069	.82531	.60487	.61678	.58558	.58571	.60623	.30655	.54286	.69063	.51131
T070	.81220	.56609	.65395	.57518	.74070	.62942	.53456	.36290	.59197	.56855
T071	.69511	.81039	.66177	.38271	.61309	.54192	.38269	.66085	.83181	.68707
T072	.84824	.77471	.73029	.71698	.71087	.58901	.46252	.62160	.79256	.68743

	T011	T012	T013	T014	T015	T016	T017	T018	T019	T020
T001	.78771	.76246	.70101	.79377	.60585	.66827	.55343	.77458	.57382	.74414
T002	.74929	.71710	.75402	.70640	.78021	.90014	.87075	.76630	.95794	.88542
T003	.85424	.82261	.83765	.81305	.90199	.88070	.83860	.88228	.88942	.90645
T004	.76428	.80242	.67762	.83664	.75359	.56033	.51319	.78782	.45554	.70200
T005	.67092	.63052	.67712	.65154	.62912	.66278	.60330	.73162	.67598	.79523
T006	.59017	.57677	.58598	.61860	.52881	.49345	.40537	.58415	.42321	.60512
T007	.43616	.48595	.57153	.51167	.47316	.35270	.32157	.49858	.35335	.48935
T008	.60492	.54489	.58850	.62667	.59048	.84176	.93080	.58827	.74982	.77061
T009	.74966	.70739	.72916	.75969	.73462	.92320	.91812	.77391	.84672	.91909
T010	.75642	.73115	.75763	.75083	.78497	.82831	.79531	.82436	.87877	.83533
T011	1.00000	.94070	.83801	.92754	.87874	.79747	.70673	.91291	.70698	.82000
T012	.94070	1.00000	.90249	.91842	.85482	.74991	.66219	.91674	.69184	.76768
T013	.83801	.90249	1.00000	.80884	.83151	.72853	.72139	.90143	.71882	.73336
T014	.92754	.91842	.80884	1.00000	.85025	.77932	.71379	.90511	.68847	.80526
T015	.87874	.85482	.83151	.85025	1.00000	.85969	.79519	.88718	.79550	.90669
T016	.79747	.74991	.72853	.77932	.85969	1.00000	.93517	.80870	.89786	.90834
T017	.70673	.66219	.72139	.71379	.79519	.93517	1.00000	.75253	.86966	.88108

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T011	T012	T013	T014	T015	T016	T017	T018	T019	T020
T018	.91291	.91674	.90143	.90511	.88718	.80870	.75253	1.00000	.75026	.85640
T019	.70698	.69184	.71882	.68847	.79550	.89786	.86966	.75026	1.00000	.85620
T020	.82000	.76168	.73336	.80526	.90669	.90834	.88108	.85640	.85620	1.00000
T021	.86370	.82283	.81636	.82911	.91806	.94145	.86301	.87013	.85676	.91471
T022	.80028	.80103	.76108	.85393	.82704	.90220	.86125	.85001	.88141	.88715
T023	.93478	.90263	.84938	.90835	.86904	.84075	.76681	.89580	.76215	.86970
T024	.77627	.77312	.79807	.81506	.76939	.89654	.86616	.83793	.87858	.96292
T025	.72956	.69396	.75314	.79313	.75200	.92279	.89764	.76088	.87315	.92013
T026	.50395	.43982	.53250	.55795	.58081	.80848	.78543	.57442	.78986	.85830
T027	.84957	.85494	.84021	.82689	.86192	.78354	.76183	.84665	.80510	.83720
T028	.85218	.85003	.84534	.84617	.86528	.87629	.81040	.92039	.83180	.90886
T029	.70512	.67453	.68916	.72830	.85510	.90748	.85156	.70556	.78850	.82217
T030	.89696	.90114	.85599	.90226	.84302	.78207	.69529	.93789	.67889	.81595
T031	.92222	.91344	.91895	.86920	.88874	.73795	.71303	.93621	.72515	.79184
T032	.77098	.73020	.76656	.73910	.86862	.86414	.82161	.85573	.84204	.91109
T033	.82647	.83057	.83113	.79190	.84343	.89785	.86071	.84610	.93526	.89269
T034	.85928	.85979	.72461	.88216	.77866	.83213	.72299	.82404	.75642	.79133
T035	.59700	.57402	.61443	.65751	.62322	.76291	.72359	.57241	.65697	.78226
T036	.53396	.50301	.44252	.58858	.55670	.65551	.61306	.51977	.57157	.67809
T037	.70917	.68140	.67305	.73742	.68441	.78100	.72997	.68299	.67173	.82256
T038	.80040	.77035	.74150	.81462	.68677	.73979	.64152	.77550	.64834	.83345
T039	.68039	.67862	.61988	.75775	.54981	.58316	.54603	.63532	.49420	.66733
T040	.72028	.69260	.71898	.74984	.67013	.66388	.61751	.70526	.62749	.73264
T041	.74845	.71038	.63508	.78175	.64982	.69452	.63321	.71938	.59201	.77875
T042	.70661	.70588	.60323	.76618	.55102	.62128	.55073	.66731	.51480	.68267
T043	.63520	.56994	.50023	.65756	.61395	.74180	.70590	.54833	.63857	.75985
T044	.67102	.60409	.59737	.75587	.62803	.77397	.72145	.58620	.64661	.80907
T045	.68214	.65923	.61713	.74970	.63666	.75815	.69082	.63887	.64477	.80036
T046	.64946	.62142	.62891	.66602	.61389	.70803	.65823	.61267	.62416	.75490
T047	.69942	.72739	.72061	.75225	.65083	.62352	.53181	.69804	.57104	.68015
T048	.73865	.70638	.67143	.73972	.72335	.79463	.71355	.70728	.66735	.79843
T049	.84945	.83369	.74438	.89893	.73695	.72299	.62018	.80418	.59110	.82474
T050	.69789	.66610	.63008	.74551	.71478	.79325	.75934	.65568	.69291	.82629
T051	.67563	.68860	.77669	.66289	.52922	.50931	.45826	.69257	.51768	.59620
T052	.65623	.61077	.58531	.69363	.69042	.71365	.64607	.58818	.62930	.73170
T053	.68902	.69232	.75206	.77053	.61337	.79666	.75404	.75632	.70687	.88700
T054	.66720	.67983	.74921	.67350	.47219	.47657	.43464	.67594	.47797	.61839
T055	.70185	.68791	.74677	.79027	.61149	.78357	.72198	.71370	.69360	.87793
T056	.65005	.61614	.69587	.78852	.67554	.83396	.76687	.63296	.69542	.84418
T057	.57260	.50400	.52665	.59136	.56071	.72608	.72834	.60157	.68255	.83139
T058	.32077	.30970	.36559	.37794	.39096	.61801	.61849	.41654	.63364	.74322
T059	.68016	.63952	.70454	.73663	.76039	.89145	.85652	.75252	.86723	.88296
T060	.76944	.76439	.75132	.90254	.68549	.73640	.67374	.78437	.66184	.76355
T061	.84358	.82517	.79930	.90136	.74930	.81023	.73655	.87261	.73017	.87992
T062	.76947	.77975	.74521	.76037	.57767	.67659	.58593	.75612	.65420	.85101
T063	.53580	.47915	.57389	.56366	.63610	.83870	.80948	.60604	.84033	.84556
T064	.62505	.59600	.69975	.70332	.65641	.88329	.83846	.66602	.84113	.87607
T065	.63937	.63270	.67824	.71295	.66577	.87836	.86896	.68085	.85986	.89705
T066	.46512	.42930	.59018	.57479	.47306	.80136	.78844	.52449	.73639	.79003

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T011	T012	T013	T014	T015	T016	T017	T018	T019	T020
T067	.78125	.81292	.79817	.81292	.67683	.62718	.54312	.78971	.61785	.69503
T068	.57707	.52761	.60269	.62658	.60617	.85920	.82318	.58303	.80435	.84919
T069	.72120	.64436	.62850	.80911	.66537	.63630	.53360	.69601	.52229	.73603
T070	.70739	.69405	.71616	.71800	.67572	.55222	.48814	.74716	.47092	.70629
T071	.56307	.51707	.57219	.61531	.56090	.77512	.73916	.56321	.73036	.79429
T072	.79426	.78072	.79748	.87846	.67317	.77363	.70904	.81479	.67973	.86530

	T021	T022	T023	T024	T025	T026	T027	T028	T029	T030
T001	.70383	.67068	.78748	.74168	.73515	.51277	.60657	.75182	.59102	.72563
T002	.86137	.87091	.80723	.91478	.90246	.81261	.80155	.85571	.79186	.71165
T003	.88481	.87906	.87403	.82479	.79972	.64057	.89425	.91663	.77291	.83275
T004	.64964	.67986	.75283	.66453	.53372	.40855	.71373	.67176	.55858	.80899
T005	.73363	.66304	.76702	.79565	.75607	.64450	.70112	.80114	.63231	.63702
T006	.54122	.48517	.60777	.54872	.48102	.38164	.54745	.64518	.45331	.58020
T007	.47922	.32125	.53832	.46113	.39382	.24520	.50586	.51619	.30931	.36181
T008	.70223	.75349	.60020	.76475	.81309	.69595	.61479	.58526	.78181	.56726
T009	.87902	.84487	.80657	.88824	.93560	.79444	.71509	.81970	.83151	.72352
T010	.84983	.84939	.81477	.81449	.76536	.64961	.87447	.86704	.73686	.74563
T011	.86370	.80028	.93478	.77627	.72956	.50395	.84557	.85718	.70512	.89696
T012	.82283	.80103	.90263	.77312	.69396	.43982	.85494	.85003	.67453	.90114
T013	.81636	.76108	.84938	.79807	.75314	.53250	.84021	.84534	.68916	.85599
T014	.82911	.85393	.90835	.81506	.79313	.55795	.82689	.84617	.72830	.90226
T015	.91806	.82704	.86904	.76939	.74200	.58081	.86192	.86528	.85510	.84302
T016	.94145	.90220	.84075	.89654	.92279	.80848	.78354	.87529	.90748	.78207
T017	.86301	.86125	.76681	.86616	.89764	.78543	.76183	.81040	.85156	.69529
T018	.87013	.85001	.89580	.83793	.76088	.57442	.84665	.92039	.70556	.93789
T019	.85676	.86141	.76215	.87858	.87315	.78986	.80510	.83180	.78850	.67889
T020	.91471	.88715	.86970	.96292	.92013	.85830	.83720	.90886	.82217	.81595
T021	1.00000	.85859	.90980	.85227	.83798	.64110	.83386	.88997	.89632	.82844
T022	.85859	1.00000	.83899	.87810	.86590	.72721	.82201	.89454	.82040	.84519
T023	.90980	.83899	1.00000	.81471	.80242	.56756	.87187	.91012	.78971	.85256
T024	.85227	.87810	.81471	1.00000	.93682	.86509	.79115	.85722	.76792	.78236
T025	.83798	.86590	.80242	.93682	1.00000	.90208	.70859	.79500	.79082	.71050
T026	.64110	.72721	.56756	.86509	.90208	1.00000	.55407	.65333	.68832	.51529
T027	.83386	.82201	.87187	.79115	.70859	.55407	1.00000	.87741	.68125	.80376
T028	.88997	.89454	.91012	.85722	.79500	.65333	.87741	1.00000	.77073	.86252
T029	.89632	.82040	.78971	.76792	.79082	.68832	.68125	.77073	1.00000	.70135
T030	.82844	.84519	.85256	.78236	.71050	.51529	.80376	.86252	.70135	1.00000
T031	.84044	.79785	.90651	.77712	.65868	.44226	.87957	.89808	.66416	.87185
T032	.87682	.84073	.84085	.82696	.75550	.70095	.88110	.95486	.77075	.77454
T033	.89933	.87516	.84874	.87072	.84798	.68911	.89540	.87562	.78486	.79398
T034	.81299	.88212	.80976	.80068	.78600	.57445	.75103	.78289	.74299	.85056
T035	.72763	.64404	.67008	.77949	.83225	.69203	.57685	.65991	.70466	.55347
T036	.64016	.64116	.59451	.62771	.71170	.57230	.51835	.57038	.59020	.50795
T037	.76783	.72985	.77061	.79724	.82763	.67468	.67595	.74858	.71511	.66992

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T021	T022	T023	T024	T025	T026	T027	T028	T029	T030
T038	.76850	.71719	.82638	.79167	.81131	.63309	.65926	.80697	.68645	.73504
T039	.61964	.51579	.71854	.67602	.70285	.49162	.60567	.61905	.52466	.61981
T040	.69811	.64547	.74579	.74668	.72989	.61631	.66197	.71746	.62168	.64572
T041	.72241	.60030	.76585	.77825	.70547	.60340	.61118	.70678	.64774	.70155
T042	.63641	.62372	.71586	.68935	.70546	.48818	.59249	.62833	.57387	.66185
T043	.70611	.69145	.68186	.70553	.70592	.61370	.58096	.63331	.68089	.53732
T044	.68860	.67779	.65886	.79436	.80202	.72282	.61983	.62400	.66292	.59982
T045	.71343	.70118	.72147	.79695	.82892	.68814	.61136	.68752	.68268	.63920
T046	.71383	.63335	.72534	.73215	.79588	.62612	.59809	.67715	.67076	.56241
T047	.67348	.65744	.70882	.67558	.59693	.46223	.66398	.68368	.59053	.68678
T048	.78678	.70936	.77090	.79632	.81624	.61493	.66927	.78150	.73738	.70025
T049	.75783	.73070	.84413	.78822	.76789	.55884	.71364	.78764	.66899	.80209
T050	.75334	.73375	.74056	.82542	.85208	.72922	.67471	.72005	.72244	.64429
T051	.64162	.51849	.73024	.63656	.69467	.41804	.59334	.71539	.51429	.58433
T052	.68848	.67948	.68461	.75113	.76716	.66984	.62114	.63084	.61476	.64117
T053	.73916	.75152	.75285	.87681	.86529	.73092	.67481	.76593	.69500	.67383
T054	.58935	.49471	.70276	.68347	.58774	.45953	.59587	.68161	.45970	.59409
T055	.72948	.70755	.74573	.86094	.86952	.71876	.65410	.73059	.64838	.64140
T056	.69788	.71258	.65823	.82948	.86163	.72864	.62390	.63553	.65634	.61759
T057	.67727	.68514	.63987	.74250	.82487	.75348	.54466	.65276	.67509	.55663
T058	.53629	.56080	.44562	.68624	.82342	.75825	.41416	.52388	.53479	.34200
T059	.81482	.86206	.73979	.89736	.89647	.82138	.75884	.80454	.78184	.69756
T060	.75460	.76744	.80810	.76938	.76913	.57084	.69804	.72745	.65769	.75602
T061	.79719	.86406	.87484	.86619	.81791	.70168	.75466	.86288	.70971	.82877
T062	.71400	.70816	.78970	.83711	.80922	.60631	.64510	.79251	.63500	.71986
T063	.74278	.75782	.62216	.85311	.90256	.89546	.63495	.72310	.70787	.55034
T064	.77508	.80069	.70670	.87856	.91381	.86283	.67377	.75338	.76395	.61349
T065	.76218	.82251	.67581	.93028	.88900	.84457	.71225	.77233	.76531	.62121
T066	.62136	.66069	.51970	.78676	.83330	.85129	.49398	.57600	.66035	.48223
T067	.66831	.65472	.76332	.73837	.74494	.53656	.63364	.70648	.51369	.70262
T068	.74283	.77506	.64219	.84603	.91401	.84992	.59164	.67072	.74588	.56171
T069	.61850	.60609	.67657	.69028	.70670	.56203	.52053	.56210	.49822	.68831
T070	.63564	.56092	.74790	.65509	.61320	.45004	.62496	.71529	.42070	.68085
T071	.68091	.70114	.62931	.77583	.84869	.78390	.56244	.66750	.71500	.53746
T072	.74975	.79494	.81954	.85282	.82708	.70925	.71162	.79754	.67415	.77469

	T031	T032	T033	T034	T035	T036	T037	T038	T039	T040
T001	.67818	.66035	.64326	.71734	.69578	.69482	.80164	.93343	.85600	.86066
T002	.74973	.85021	.92318	.74570	.72294	.61111	.73576	.74226	.56956	.71767
T003	.86793	.90887	.92285	.79050	.62238	.55582	.69917	.72375	.57177	.68512
T004	.77313	.57371	.63361	.70489	.48737	.45665	.60851	.66128	.61143	.65792
T005	.72988	.79295	.70615	.55763	.58095	.45361	.65035	.78027	.60463	.64465
T006	.57066	.48903	.51694	.50539	.58196	.46617	.66787	.66628	.55932	.68753
T007	.48686	.51847	.37309	.32281	.44286	.31285	.47282	.55685	.43094	.60837
T008	.59131	.59899	.73600	.70580	.63125	.45743	.62692	.48527	.43645	.48550

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T031	T032	T033	T034	T035	T036	T037	T038	T039	T040
T009	.68318	.77248	.87302	.78978	.80450	.67255	.82459	.79959	.67132	.69109
T010	.81341	.85064	.89906	.76181	.60297	.54938	.65828	.66862	.50711	.60376
T011	.92222	.77098	.82647	.85528	.59700	.53396	.70917	.80040	.68039	.72028
T012	.91344	.73020	.83057	.85979	.67402	.50301	.68140	.77635	.67862	.69260
T013	.91895	.76656	.83113	.72461	.61443	.44252	.67305	.74150	.61988	.71898
T014	.86920	.73910	.79190	.88216	.65751	.58858	.73742	.81462	.75775	.74984
T015	.88874	.86062	.84343	.77866	.62322	.55670	.68441	.68677	.54981	.67013
T016	.73795	.86414	.89785	.83213	.76291	.65551	.78100	.73979	.58315	.66388
T017	.71303	.82161	.86071	.72299	.74359	.61306	.72997	.64152	.54603	.61751
T018	.93621	.85573	.84610	.82404	.57241	.51977	.68299	.77550	.63532	.70526
T019	.72515	.84204	.93526	.75642	.65697	.57157	.67173	.64834	.49420	.62749
T020	.79184	.91109	.89269	.79133	.70226	.67809	.82256	.83345	.66733	.73264
T021	.84044	.87682	.89933	.81299	.72163	.64016	.76783	.76850	.61964	.69811
T022	.79785	.84673	.87516	.88212	.64404	.64116	.72985	.71719	.57579	.64547
T023	.90651	.84085	.84874	.80976	.67000	.59451	.77061	.82638	.71854	.74579
T024	.77712	.82096	.87072	.80068	.77949	.62771	.79724	.79167	.67602	.74668
T025	.65868	.75550	.84798	.78600	.83225	.71170	.82763	.81131	.70285	.72989
T026	.44226	.70095	.68911	.57445	.69202	.57230	.67468	.63309	.49162	.61631
T027	.87257	.88110	.89540	.75103	.57685	.51835	.67595	.65926	.60567	.66197
T028	.89808	.95486	.87562	.78289	.65991	.57038	.74858	.80697	.61905	.71746
T029	.66416	.77075	.78486	.74299	.70466	.59020	.71511	.68645	.52466	.62168
T030	.87185	.77454	.79398	.85056	.55347	.50795	.66992	.73504	.61981	.64572
T031	1.00000	.89389	.81288	.72960	.50844	.44291	.59797	.68462	.60875	.67270
T032	.89389	1.00000	.85988	.67512	.59356	.54904	.66889	.72257	.53159	.67178
T033	.81288	.85988	1.00000	.82350	.68095	.61101	.74748	.70024	.61362	.67389
T034	.72960	.67512	.82350	1.00000	.65628	.63026	.74441	.75679	.64560	.65279
T035	.50844	.59356	.68095	.65628	1.00000	.79245	.93923	.80105	.76660	.73851
T036	.44291	.54904	.61101	.63026	.79245	1.00000	.82502	.70620	.77591	.67013
T037	.59797	.66889	.74748	.74441	.93923	.82502	1.00000	.87879	.82338	.79258
T038	.68462	.72257	.70024	.75679	.80105	.70620	.87879	1.00000	.84691	.85428
T039	.60875	.53159	.61362	.64560	.76660	.77591	.82338	.84691	1.00000	.76360
T040	.67270	.67178	.67389	.65279	.73851	.67013	.79258	.85428	.76360	1.00000
T041	.63457	.64309	.66646	.71900	.83761	.81211	.87885	.88760	.91647	.83489
T042	.60903	.53379	.62371	.70063	.75634	.80943	.81068	.83967	.95533	.77031
T043	.49701	.60034	.67343	.69660	.85143	.92724	.89061	.76279	.75761	.70475
T044	.55458	.56393	.66466	.68508	.83692	.71544	.84042	.72071	.72878	.71926
T045	.54143	.59117	.68704	.75439	.94706	.80534	.95845	.85833	.83129	.76052
T046	.54986	.62403	.68289	.65578	.88872	.80885	.92464	.86215	.81608	.80731
T047	.70215	.61394	.60891	.66310	.60381	.54363	.67989	.74288	.63344	.76943
T048	.61009	.70335	.72913	.74707	.92898	.74386	.93591	.88648	.83512	.76017
T049	.73290	.68362	.68440	.79207	.75484	.65710	.85667	.93373	.87063	.81680
T050	.57602	.65794	.72994	.73596	.96371	.83539	.96520	.82611	.79433	.77753
T051	.60348	.65079	.57163	.51473	.59073	.40377	.65570	.81892	.68382	.76949
T052	.51757	.56717	.71762	.73798	.85855	.83326	.91428	.84136	.86675	.80328
T053	.67557	.68282	.72899	.71535	.80707	.66806	.80009	.81831	.74205	.76516
T054	.60696	.61221	.54495	.49455	.60244	.40405	.65466	.80682	.73389	.75157
T055	.63208	.65631	.70616	.70935	.83131	.64923	.82503	.85348	.76761	.77412
T056	.55985	.59384	.71638	.70400	.85389	.70675	.82909	.77919	.76453	.74168
T057	.46889	.62353	.67062	.65898	.78939	.74694	.77605	.70724	.54921	.67735

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T031	T032	T033	T034	T035	T036	T037	T038	T039	T040
T058	.30706	.54052	.54580	.46173	.66256	.67305	.61999	.55366	.45595	.54477
T059	.66056	.80874	.84309	.75574	.73024	.64206	.74873	.78153	.63415	.68531
T060	.76282	.67251	.74505	.84251	.65630	.61889	.75246	.80894	.75455	.74201
T061	.81742	.79017	.75740	.82202	.67382	.64209	.76888	.85865	.75019	.80521
T062	.67831	.68529	.71366	.74071	.72992	.62043	.79391	.88111	.75227	.77207
T063	.50947	.75422	.76206	.62260	.71837	.60534	.69777	.66888	.50524	.63028
T064	.69215	.74204	.78578	.70102	.75419	.63327	.75015	.74128	.62048	.72346
T065	.83367	.74949	.80505	.68368	.75929	.57719	.70549	.66223	.54679	.67622
T066	.43348	.56539	.64387	.56037	.74437	.59403	.66992	.56531	.50446	.58440
T067	.73832	.61178	.69314	.71648	.68740	.63522	.75052	.88699	.80377	.81608
T068	.51451	.64547	.75232	.70321	.78900	.67563	.75243	.68460	.57401	.64766
T069	.59428	.53175	.59407	.75859	.66650	.73081	.78808	.80459	.75161	.72814
T070	.68200	.63888	.58652	.56953	.58832	.53421	.70115	.80557	.70734	.74213
T071	.44769	.62484	.70759	.66027	.88245	.77100	.84156	.78186	.63188	.72229
T072	.74822	.70207	.73429	.79130	.73061	.66589	.80180	.87318	.77100	.83617

	T041	T042	T043	T044	T045	T046	T047	T048	T049	T050
T001	.90661	.89042	.72126	.67507	.77106	.79214	.70861	.80485	.89627	.74285
T002	.66889	.58163	.67699	.70916	.70315	.71971	.62873	.72774	.67178	.75091
T003	.65953	.57539	.62180	.61142	.64155	.64282	.65820	.71804	.70651	.69171
T004	.64929	.65429	.46824	.61933	.59849	.54574	.73269	.55557	.77657	.61034
T005	.66960	.58835	.51638	.52889	.61981	.64850	.57934	.66493	.72035	.61008
T006	.65171	.55045	.49990	.54206	.63723	.61164	.82627	.68350	.66689	.60668
T007	.41922	.38878	.39483	.39353	.40573	.59357	.64434	.47244	.51674	.43782
T008	.48867	.40005	.60775	.64401	.63087	.47321	.35637	.56743	.50403	.67303
T009	.76044	.65988	.77761	.75554	.80201	.77568	.59687	.81907	.75308	.81516
T010	.58564	.51962	.56792	.59276	.60427	.59578	.58897	.67946	.64779	.65516
T011	.74845	.70661	.63520	.67102	.68214	.64546	.69542	.73865	.84945	.69789
T012	.71038	.70588	.56994	.60409	.65923	.62142	.72739	.70638	.83369	.66610
T013	.63908	.60323	.50023	.59737	.61713	.62891	.72061	.67143	.74438	.63008
T014	.78175	.70618	.65756	.75587	.74970	.66602	.75225	.73972	.89893	.74551
T015	.84982	.55102	.61395	.62003	.63666	.61389	.65383	.72335	.73695	.71478
T016	.69452	.62128	.74180	.77397	.75815	.70803	.62352	.79463	.72299	.79325
T017	.63321	.55073	.70590	.72145	.69082	.65823	.53181	.71355	.62018	.75934
T018	.71938	.66731	.54833	.58620	.63887	.61267	.69804	.70728	.80418	.65568
T019	.59201	.51480	.63857	.64661	.64477	.62416	.57104	.66735	.59110	.69291
T020	.77875	.68267	.75985	.80907	.80036	.75490	.68015	.79843	.82474	.82629
T021	.72241	.63041	.70611	.68860	.71343	.71383	.67348	.78678	.75783	.75334
T022	.68030	.62372	.69145	.67779	.70118	.63335	.65744	.70936	.73070	.73375
T023	.76585	.71586	.68185	.65886	.72147	.72534	.70882	.77090	.84413	.74056
T024	.77825	.68935	.70553	.79436	.79695	.73215	.67558	.79632	.78822	.82542
T025	.78547	.70546	.78592	.80202	.82892	.79588	.59693	.81624	.76789	.85208
T026	.60340	.48818	.61370	.72282	.68814	.62612	.46223	.61493	.55884	.72922
T027	.61118	.59249	.58096	.61983	.61136	.59809	.66398	.66927	.71364	.67471
T028	.70678	.62833	.63331	.62400	.68752	.67715	.68368	.78150	.78764	.72005

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T041	T042	T043	T044	T045	T046	T047	T048	T049	T050
T029	.64774	.57387	.68089	.66292	.68268	.67076	.59053	.73738	.66899	.72244
T030	.70155	.66185	.53732	.59982	.63920	.56241	.68678	.70025	.80209	.64429
T031	.63457	.60903	.49701	.55458	.54143	.54986	.70215	.61009	.73290	.57602
T032	.64309	.53379	.60034	.56393	.59117	.62403	.61394	.70335	.68362	.65794
T033	.66646	.62371	.67343	.66466	.68704	.68289	.60891	.72913	.68440	.72994
T034	.71900	.70063	.69660	.68508	.75439	.65578	.66310	.74707	.79207	.73596
T035	.83761	.75034	.85143	.83692	.94706	.88872	.60381	.92898	.75484	.96371
T036	.81211	.80943	.92724	.71544	.80534	.80885	.54363	.74386	.65710	.83539
T037	.87885	.81068	.89061	.84042	.95845	.92464	.67989	.93591	.85667	.96520
T038	.88760	.83967	.76279	.72071	.85833	.86215	.74288	.88648	.93373	.82611
T039	.91647	.95533	.75761	.72878	.83129	.81608	.63344	.83512	.87063	.79433
T040	.83489	.77031	.70475	.71926	.76052	.80731	.76943	.76017	.81680	.77753
T041	1.00000	.92108	.81744	.78027	.87733	.84425	.69506	.86636	.89914	.86598
T042	.92108	1.00000	.76384	.72892	.82227	.77077	.64581	.81788	.86749	.78518
T043	.81744	.76384	1.00000	.79228	.85314	.86656	.58072	.82443	.71761	.90015
T044	.78027	.72892	.79228	1.00000	.85495	.79779	.59686	.85555	.76455	.87980
T045	.87733	.82227	.85314	.85495	1.00000	.86918	.62985	.94534	.86592	.96148
T046	.84425	.77077	.86656	.79779	.86918	1.00000	.69984	.86955	.79234	.89015
T047	.69506	.64581	.58072	.59686	.62985	.69984	1.00000	.67118	.73451	.65339
T048	.86636	.81788	.82443	.85555	.94534	.86955	.67118	1.00000	.89057	.90776
T049	.89914	.86749	.71761	.76455	.86592	.79234	.73451	.89057	1.00000	.82867
T050	.86598	.78518	.90015	.87980	.96148	.89015	.65339	.90776	.82867	1.00000
T051	.68396	.60276	.48080	.51432	.58610	.72488	.70945	.64439	.73067	.56149
T052	.88160	.88414	.88331	.81554	.90466	.92960	.60036	.87165	.81016	.90037
T053	.79838	.72849	.72341	.78170	.80031	.80916	.62148	.81115	.79126	.82027
T054	.72756	.67352	.48976	.58301	.82152	.68789	.65388	.68435	.78587	.58994
T055	.81432	.73485	.72777	.83234	.83771	.84041	.63725	.85306	.82935	.83228
T056	.83423	.73783	.76258	.90045	.86858	.83278	.51313	.88622	.77668	.85779
T057	.68901	.57078	.75777	.70153	.74813	.73518	.49054	.68450	.61583	.82450
T058	.55553	.51159	.65321	.57988	.59730	.64201	.34895	.51397	.41721	.70581
T059	.71897	.62873	.68482	.74327	.74096	.73059	.50964	.76159	.72652	.76024
T060	.82159	.72030	.66952	.66585	.74360	.69863	.67518	.76708	.85875	.72421
T061	.80913	.71337	.66624	.70549	.76546	.69832	.69079	.75618	.88253	.75136
T062	.82723	.76039	.70149	.69068	.76021	.79598	.70143	.76125	.83712	.75672
T063	.61300	.48051	.65976	.67468	.67413	.68115	.46614	.64981	.57339	.72112
T064	.68785	.60120	.69956	.75915	.73047	.74740	.56893	.74925	.67953	.76076
T065	.62879	.54993	.67773	.82171	.69891	.69189	.57513	.72702	.65232	.77097
T066	.61573	.48817	.65813	.73136	.66264	.64739	.41643	.67146	.49061	.71265
T067	.82444	.76189	.64446	.61499	.74122	.79768	.71546	.75384	.89531	.71462
T068	.86205	.55528	.75280	.76942	.74603	.73771	.48330	.69976	.61631	.78284
T069	.84712	.75019	.69598	.70677	.79150	.71213	.54143	.81469	.89668	.73218
T070	.74880	.67408	.58691	.54689	.64465	.69633	.64065	.67826	.78187	.63741
T071	.73345	.63266	.79796	.79885	.82841	.82561	.58866	.81848	.68420	.85618
T072	.82899	.77595	.70233	.76717	.79836	.76243	.68050	.77633	.88094	.78544

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T051	T052	T053	T054	T055	T056	T057	T058	T059	T060
T001	.77975	.79549	.77008	.82390	.79510	.73535	.64427	.48644	.70777	.80448
T002	.81036	.66395	.80908	.58242	.78597	.75254	.74656	.67186	.90340	.72952
T003	.61404	.60994	.70065	.56893	.68601	.70092	.64368	.48748	.84152	.75694
T004	.56721	.60859	.58856	.52935	.56433	.53161	.40375	.23981	.49770	.69860
T005	.84865	.54201	.71976	.86601	.72070	.54526	.61921	.59715	.69779	.65994
T006	.66569	.54053	.53345	.62231	.55299	.50341	.45782	.27893	.42878	.68446
T007	.65697	.31940	.54418	.52973	.51710	.23602	.32379	.22506	.28241	.39033
T008	.32504	.58448	.61153	.33181	.59389	.71923	.65553	.48271	.78562	.64617
T009	.60136	.72092	.81625	.55917	.81714	.81764	.78061	.62801	.88239	.78861
T010	.59863	.55569	.69559	.55461	.65932	.59762	.63731	.51349	.83405	.64529
T011	.67563	.65023	.68902	.66720	.70185	.65005	.57260	.32077	.68016	.76944
T012	.68860	.61677	.69232	.67983	.68791	.61614	.50400	.30970	.63952	.76439
T013	.77669	.58531	.75206	.74921	.74677	.69587	.52665	.36559	.70454	.75132
T014	.66289	.69363	.77053	.67350	.79027	.78852	.59136	.37794	.73663	.90254
T015	.52922	.69042	.61337	.47219	.61149	.67554	.56071	.39096	.76039	.68549
T016	.50931	.71365	.79666	.47657	.78357	.83396	.72608	.61801	.89145	.73640
T017	.45826	.64007	.75404	.43464	.72198	.76687	.72834	.61849	.85652	.67374
T018	.64257	.58818	.75632	.67594	.71370	.63296	.60157	.41654	.75252	.78437
T019	.51768	.62430	.70687	.47797	.69360	.69542	.68255	.63364	.86723	.66184
T020	.59620	.73170	.88700	.61839	.87793	.84418	.83139	.74322	.88296	.76355
T021	.64162	.68848	.73916	.58535	.72948	.69788	.67727	.53629	.81482	.75460
T022	.51849	.67948	.75152	.49471	.70755	.71258	.68514	.56680	.86206	.76744
T023	.73024	.68461	.75205	.70276	.74573	.65823	.63907	.44562	.73979	.80810
T024	.63656	.75113	.87681	.68347	.86094	.82948	.74250	.68624	.89736	.76938
T025	.59467	.76716	.86529	.58774	.86952	.86163	.82487	.82342	.89647	.76913
T026	.41804	.66984	.73092	.45953	.71076	.72864	.75348	.75825	.82138	.57084
T027	.59334	.62114	.67481	.59587	.65410	.62390	.54466	.41416	.75884	.69804
T028	.71939	.63084	.76593	.68161	.73059	.63553	.65276	.52388	.80454	.72745
T029	.51429	.61476	.69500	.45970	.64838	.65634	.67509	.53479	.78184	.65769
T030	.58433	.64117	.67383	.59409	.64140	.61759	.55663	.34200	.69756	.75602
T031	.68348	.51757	.67557	.68696	.63208	.55585	.46889	.30706	.66056	.76782
T032	.65079	.56717	.68282	.61221	.65631	.59384	.62353	.64052	.80874	.67251
T033	.57163	.71762	.72899	.54495	.70616	.71638	.67062	.54580	.84309	.74505
T034	.51473	.73798	.71535	.49455	.70935	.70400	.65898	.46173	.75574	.84251
T035	.69073	.85855	.80707	.60244	.83131	.85389	.78939	.66256	.73024	.65630
T036	.40377	.83326	.66806	.40405	.64923	.70475	.74594	.67305	.64206	.61889
T037	.65570	.91428	.80009	.65456	.82503	.82909	.77605	.61999	.74873	.75246
T038	.81892	.84136	.81831	.80682	.85348	.77919	.70724	.55366	.78153	.80894
T039	.68382	.86675	.74206	.73389	.76761	.76453	.54921	.45595	.63415	.75455
T040	.76949	.80328	.76516	.75157	.77412	.74168	.67735	.54477	.68531	.74201
T041	.68396	.88160	.79838	.72756	.81432	.83423	.68901	.55553	.71897	.82159
T042	.60276	.88414	.72849	.67352	.73485	.73783	.57078	.51159	.62873	.72030
T043	.48080	.88331	.72341	.48976	.72777	.76258	.75777	.65321	.68482	.66952
T044	.51432	.81554	.78170	.58301	.83234	.90045	.70153	.5[illegible]988	.74327	.66585
T045	.58610	.90466	.80031	.62152	.83771	.86858	.74813	.59730	.74096	.74360
T046	.72488	.92960	.80916	.68789	.89041	.83278	.73518	.64201	.73059	.69863
T047	.70945	.60036	.62148	.65388	.63725	.51313	.49054	.34895	.50964	.67518
T048	.64439	.87165	.81115	.68435	.85306	.88622	.68450	.51397	.76159	.76708
T049	.73067	.81016	.79126	.78587	.82935	.77668	.61583	.41721	.72652	.85875

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T051	T052	T053	T054	T055	T056	T057	T058	T059	T060
T050	.56149	.90037	.82027	.58994	.83228	.85779	.82450	.70581	.76024	.72421
T051	1.00000	.59154	.69427	.89267	.73195	.62569	.50955	.40585	.61270	.73152
T052	.59154	1.00000	.71405	.57813	.75724	.82304	.68447	.56526	.67054	.71531
T053	.69427	.71405	1.00000	.73687	.94969	.87362	.80732	.73173	.87203	.77127
T054	.89267	.57813	.73687	1.00000	.77879	.63282	.50783	.45013	.59600	.78605
T055	.73195	.75724	.94969	.77879	1.00000	.93448	.79162	.71002	.86774	.78077
T056	.62569	.82304	.87362	.63282	.93448	1.00000	.75477	.65304	.83218	.77579
T057	.50955	.68447	.80732	.50783	.79162	.75477	1.00000	.84097	.78292	.65205
T058	.40585	.56526	.73173	.45013	.71002	.65304	.84097	1.00000	.69202	.48069
T059	.61270	.67054	.87203	.59600	.86774	.83218	.78292	.69202	1.00000	.78623
T060	.73152	.71531	.77127	.78605	.78077	.77579	.65205	.48069	.78623	1.00000
T061	.69541	.70101	.84121	.71383	.82502	.75349	.71249	.55679	.84290	.86496
T062	.81045	.73570	.84850	.85184	.87004	.76170	.74647	.63700	.73752	.77555
T063	.52286	.61015	.77379	.48680	.77316	.72848	.81118	.79891	.88434	.61176
T064	.68903	.69725	.84595	.57645	.84092	.83442	.76732	.72930	.93020	.76275
T065	.46938	.62782	.86556	.56413	.83416	.79661	.84025	.81661	.89071	.56174
T066	.43606	.62180	.78871	.46957	.77901	.81186	.80270	.79043	.81598	.58253
T067	.80866	.74757	.76729	.80714	.82004	.76315	.61896	.54992	.69337	.84980
T068	.48307	.70767	.82687	.48316	.82432	.81916	.85786	.79534	.90459	.68301
T069	.60982	.81486	.69842	.65473	.75168	.78165	.70205	.53423	.68495	.85644
T070	.80674	.65220	.70965	.86147	.73349	.59806	.64106	.52364	.55019	.77125
T071	.58571	.74208	.82680	.59166	.83877	.83187	.88490	.76190	.84299	.72156
T072	.73051	.75102	.90091	.76601	.89732	.83779	.78081	.64180	.84983	.87906

	T061	T062	T063	T064	T065	T066	T067	T068	T069	T070
T001	.84560	.85786	.56037	.66469	.60592	.51779	.86687	.58789	.82531	.81220
T002	.80146	.75160	.87312	.89842	.89440	.76966	.67682	.85558	.60487	.56609
T003	.78607	.67540	.71673	.75563	.72671	.60718	.67360	.67861	.61678	.65395
T004	.76154	.62181	.32788	.44495	.53545	.29674	.63353	.41442	.58858	.57518
T005	.73451	.89780	.71950	.66629	.63364	.53526	.68657	.62306	.58571	.74070
T006	.57228	.63601	.35587	.45548	.37429	.33164	.59959	.34987	.60623	.62942
T007	.45930	.45907	.37291	.39416	.42804	.17046	.53716	.32892	.30665	.53456
T008	.61953	.38796	.73111	.71378	.74139	.72852	.42234	.78045	.54286	.36290
T009	.78819	.76028	.83302	.88536	.84216	.77528	.70070	.86950	.69063	.59197
T010	.75452	.64134	.73783	.72975	.81387	.62629	.55919	.68443	.51131	.56855
T011	.84358	.76547	.53580	.62505	.63937	.46512	.78125	.57707	.72120	.70739
T012	.82917	.77975	.47915	.59600	.63870	.42930	.81292	.52761	.64436	.69405
T013	.79930	.74521	.57389	.69975	.67824	.59018	.79817	.60269	.62850	.71616
T014	.90136	.76037	.56366	.70332	.71295	.57479	.81292	.62658	.80911	.71800
T015	.74930	.57767	.63610	.65641	.66577	.47306	.67683	.60617	.66537	.57572
T016	.81023	.67659	.83870	.88329	.87836	.80136	.62718	.85920	.63630	.55222
T017	.73655	.58593	.80948	.83846	.86896	.78844	.54312	.82318	.53360	.48814
T018	.87261	.75012	.60604	.66602	.68085	.52449	.78971	.58303	.69601	.74716
T019	.73017	.65420	.84033	.84113	.85986	.73639	.61785	.80435	.52229	.47092
T020	.87992	.85101	.84556	.87607	.89705	.79003	.69503	.84919	.73603	.70629

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T061	T062	T063	T064	T065	T066	T067	T068	T069	T070
T021	.79719	.71400	.74276	.77508	.76418	.62136	.66831	.74283	.61850	.63564
T022	.86406	.70816	.75782	.80669	.82251	.66669	.65472	.77506	.60609	.56092
T023	.87484	.78970	.62276	.70670	.67581	.51970	.76332	.64219	.67657	.74790
T024	.86619	.83711	.85311	.87856	.93028	.78676	.73837	.84603	.69028	.65509
T025	.81291	.80922	.90256	.91381	.88900	.83330	.74494	.91401	.70670	.61320
T026	.70168	.60031	.89546	.86283	.84457	.85129	.53656	.84992	.56203	.45004
T027	.75466	.64510	.63495	.67377	.71225	.49398	.63364	.59164	.52053	.62496
T028	.86288	.79251	.72310	.75338	.77433	.57600	.70648	.67072	.56210	.71529
T029	.70971	.63500	.70787	.76395	.76531	.66035	.51369	.74588	.49822	.42070
T030	.82877	.71986	.55034	.61349	.62121	.48223	.70262	.56171	.68831	.68085
T031	.81742	.67031	.50547	.59215	.63367	.43348	.73832	.51451	.59428	.68200
T032	.79017	.68529	.75422	.74204	.74949	.56539	.61178	.64547	.53175	.63888
T033	.75740	.71366	.76206	.78578	.80505	.64387	.69314	.75232	.59407	.58652
T034	.82202	.74071	.62260	.70102	.68368	.56037	.71648	.70321	.75859	.56953
T035	.67382	.72992	.71837	.75219	.75929	.74437	.68740	.78900	.66650	.58832
T036	.64209	.62043	.60534	.63327	.57719	.59403	.63522	.67563	.73081	.53421
T037	.76888	.79391	.69777	.75015	.70549	.66992	.75052	.75243	.78808	.70115
T038	.85865	.88111	.66888	.74128	.66223	.56531	.88699	.68460	.80459	.80557
T039	.75019	.75227	.50524	.62048	.54679	.50446	.80377	.57401	.75161	.70734
T040	.80521	.77207	.63028	.72346	.67622	.58440	.81608	.64766	.72814	.74213
T041	.80913	.82723	.61300	.68785	.62879	.61573	.82444	.66205	.84712	.74880
T042	.77337	.76039	.48051	.60120	.54993	.48817	.76189	.55528	.75019	.67408
T043	.66624	.70149	.65976	.69956	.67773	.65813	.64446	.75280	.69598	.58691
T044	.70949	.69068	.67468	.75915	.82171	.73136	.61499	.76942	.70677	.54689
T045	.76946	.76021	.67413	.73047	.69891	.66264	.74122	.74603	.79150	.64465
T046	.69832	.79598	.68115	.74740	.69189	.64739	.79768	.73771	.71213	.69633
T047	.69079	.70143	.46614	.56893	.57613	.41643	.71546	.48330	.54143	.64065
T048	.75618	.76125	.64981	.74925	.72702	.67146	.75384	.69976	.81469	.67826
T049	.88253	.83712	.57339	.67953	.65232	.49061	.89531	.61631	.89668	.78187
T050	.75136	.75672	.72112	.76076	.77097	.71265	.71462	.78284	.73218	.63741
T051	.69541	.81045	.52286	.58903	.46938	.43606	.80866	.48307	.60582	.80674
T052	.70101	.73570	.61015	.69725	.62782	.62180	.74757	.70767	.81486	.65220
T053	.84121	.84850	.77379	.84595	.86556	.78871	.76729	.82687	.69842	.70965
T054	.71383	.85184	.48680	.57645	.56413	.46957	.80714	.48316	.65473	.86147
T055	.82502	.87004	.77316	.84092	.83416	.77901	.82004	.82232	.75168	.73349
T056	.75349	.76170	.72848	.83442	.79661	.81186	.76315	.81916	.78165	.59806
T057	.71249	.74647	.81118	.76732	.84025	.80270	.61896	.85786	.70205	.64106
T058	.55679	.63700	.79891	.72930	.81661	.79043	.54992	.79534	.53423	.52364
T059	.84290	.73752	.88434	.93020	.89071	.81598	.69337	.90459	.68495	.55019
T060	.86496	.77655	.61176	.76275	.56174	.58253	.84980	.68301	.85644	.77125
T061	1.00000	.81688	.71318	.79184	.75378	.59097	.84557	.75027	.83528	.73530
T062	.81688	1.00000	.67299	.71009	.72755	.60844	.88131	.70673	.75418	.82509
T063	.71318	.67299	1.00000	.91111	.87864	.85273	.61876	.93337	.64155	.49071
T064	.79184	.71009	.91111	1.00000	.88580	.84312	.69457	.92111	.69316	.52197
T065	.75378	.72755	.87864	.88580	1.00000	.86447	.57085	.89809	.40872	.48441
T066	.59097	.60844	.85273	.84312	.86447	1.00000	.52977	.85473	.55665	.43110
T067	.84557	.88131	.61876	.69457	.57085	.52977	1.00000	.65499	.82562	.78927
T068	.75027	.70673	.93337	.92111	.89809	.85473	.65499	1.00000	.70985	.48797
T069	.83528	.75418	.64155	.69316	.40872	.55665	.82562	.70985	1.00000	.71801

	T061	T062	T063	T064	T065	T066	T067	T068	T069	T070
T070	.73530	.82509	.49071	.52197	.68441	.43110	.78927	.48797	.71801	1.00000
T071	.70882	.75299	.81867	.83180	.81135	.80948	.68096	.85706	.71099	.58079
T072	.96100	.86656	.72140	.81896	.76042	.66205	.87764	.79858	.86237	.78656

Table A.5.T. Correlation Matrix for the Target Area over All Bands.

	T071	T072
T001	.69511	.84824
T002	.81039	.77471
T003	.66177	.73029
T004	.38271	.71098
T005	.61309	.71087
T006	.54192	.58901
T007	.38269	.46252
T008	.66085	.62160
T009	.83181	.79256
T010	.68707	.68743
T011	.56307	.79426
T012	.51707	.78072
T013	.57219	.79748
T014	.61531	.87846
T015	.56090	.67317
T016	.77512	.77363
T017	.73916	.70904
T018	.56321	.81479
T019	.73036	.67973
T020	.79429	.86530
T021	.68091	.74975
T022	.70114	.79494
T023	.82931	.81954
T024	.77583	.85282
T025	.84869	.82708
T026	.78390	.70925
T027	.56244	.71162
T028	.66750	.79754
T029	.71500	.67415
T030	.53746	.77469
T031	.44769	.74522
T032	.62984	.70207
T033	.70759	.73429
T034	.66027	.79130
T035	.88245	.73061
T036	.77100	.66589
T037	.84156	.80180
T038	.78186	.87318
T039	.63188	.77100
T040	.72229	.83617
T041	.73345	.82899
T042	.63266	.77595
T043	.79796	.70233
T044	.79885	.70717
T045	.82841	.79836
T046	.82961	.76243
T047	.58866	.68050
T048	.81848	.77033
T049	.68920	.88094
T050	.85618	.78544
T051	.58571	.73051
T052	.74208	.75302
T053	.82680	.90091
T054	.59166	.76001
T055	.83877	.89732
T056	.83187	.83779
T057	.88490	.78081
T058	.76190	.64180
T059	.84299	.84903
T060	.72156	.87906
T061	.70882	.96100
T062	.75299	.86656
T063	.81867	.72140
T064	.83180	.81896
T065	.81135	.76042
T066	.80948	.66205
T067	.68096	.87764
T068	.85206	.79858
T069	.71099	.80237
T070	.58079	.78056
T071	1.00000	.77460
T072	.77460	1.00000

TABLE A.5.C. Correlation Matrix for the Control Area over All Bands.

	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10
C01	1.00000	.79743	.71077	.68038	.75048	.75271	.71872	.79983	.78387	.71716
C02	.79743	1.00000	.87778	.75655	.81670	.76238	.76765	.83293	.86915	.80357
C03	.71077	.87778	1.00000	.70622	.72747	.68029	.74945	.70899	.83441	.73796
C04	.68038	.75655	.70622	1.00000	.78910	.76168	.71977	.70162	.75407	.82096
C05	.75048	.81670	.72747	.78910	1.00000	.78015	.80758	.86354	.86511	.91735
C06	.75271	.76238	.68029	.76168	.78015	1.00000	.91127	.85580	.74410	.82055
C07	.71872	.76765	.74945	.71977	.80758	.91127	1.00000	.89626	.78862	.82353
C08	.79983	.83293	.70899	.70162	.86354	.85580	.89626	1.00000	.81621	.87635
C09	.78387	.86915	.83441	.75407	.86511	.74410	.78862	.81621	1.00000	.85415
C10	.71716	.80357	.73796	.82096	.91735	.82055	.82353	.87635	.85415	1.00000
C11	.71219	.71553	.68970	.73413	.79898	.61876	.67606	.66332	.86642	.82123
C12	.72486	.80825	.73976	.78980	.97520	.76094	.79288	.85335	.86861	.91371
C13	.65055	.77353	.74798	.84306	.79508	.74088	.72909	.67390	.81299	.81747
C14	.54787	.58528	.64001	.78640	.70864	.73934	.68350	.69011	.59589	.74359
C15	.45729	.60682	.63106	.83433	.64033	.54885	.55580	.51880	.54861	.65175
C16	.75149	.78805	.72404	.79819	.78333	.98067	.91148	.85487	.75578	.82211
C17	.79067	.92696	.86346	.65393	.73695	.69152	.72529	.74976	.84525	.72833
C18	.62117	.62893	.59681	.85005	.74443	.85742	.77691	.74216	.62809	.80118
C19	.69111	.70151	.69193	.93887	.77490	.70491	.67108	.67393	.71571	.80510

	C11	C12	C13	C14	C15	C16	C17	C18	C19
C01	.71219	.72486	.65055	.54787	.45729	.75149	.79067	.62117	.69111
C02	.71553	.80825	.77353	.58528	.60682	.78805	.92696	.62893	.70151
C03	.68970	.73976	.74798	.64001	.63106	.72404	.86346	.59681	.69193
C04	.73413	.78980	.84306	.78640	.83433	.79819	.65393	.85005	.93887
C05	.79898	.97520	.79508	.70864	.64033	.78333	.73695	.74443	.77490
C06	.61876	.76094	.74088	.73934	.54885	.98067	.69152	.85742	.70491
C07	.67606	.79288	.72909	.68350	.55580	.91148	.72529	.77691	.67108
C08	.66332	.85335	.67390	.69011	.51880	.85487	.74976	.74216	.67393
C09	.86642	.86861	.81299	.59589	.54861	.75578	.84525	.62809	.71571
C10	.82123	.91371	.81747	.74359	.65175	.82211	.72833	.80118	.80510
C11	1.00000	.81520	.79746	.56916	.52245	.64064	.68612	.55951	.74071
C12	.81520	1.00000	.82847	.72330	.64628	.76287	.74587	.74343	.77567
C13	.79746	.82847	1.00000	.68854	.64697	.77321	.74845	.71512	.79402
C14	.56916	.72330	.68854	1.00000	.74839	.73762	.50028	.84550	.82133
C15	.52245	.64628	.64697	.74839	1.00000	.58955	.52594	.69975	.82610
C16	.64064	.76287	.77321	.73762	.58955	1.00000	.71954	.85061	.72854
C17	.68612	.74587	.74845	.50028	.52594	.71954	1.00000	.54957	.63093
C18	.55951	.74343	.71512	.84550	.69975	.85061	.54957	1.00000	.85149
C19	.74071	.77567	.79402	.82133	.82610	.72854	.63093	.85149	1.00000

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Abstract next page →

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20. ABSTRACT

This paper develops applications of multivariate statistical models, particularly principal component analysis, to the analysis of data from weather modification experiments. The efficacy of these multivariate applications is examined by applying the proposed models to data from Phase I (1967-71) of the Santa Barbara Convective Band Seeding Program conducted for the Navy by North American Weather Consultants. Multivariate summary measures of precipitation are developed and multivariate methods are given to analyze the effects of cloud-seeding on precipitation. Results from these models, based on the above-mentioned data set, are reported along with conclusions and suggestions for further work. An appendix provides detailed summary statistics for the analyses.